## **AB 1400 Draft Study Report**

**FEBRUARY 25, 2021** 

# ToxStrategies

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## AB 1400 Draft Study Report

#### **FEBRUARY 25, 2021**

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#### **Abbreviations**

AB California Assembly Bill

AFSCME American Federation of State, County & Municipal Employees

BA Breathing Apparatus

CHSWC Commission on Health and Safety and Worker's Compensation

COPC chemical of potential concern

Cr(VI) hexavalent chromium

DIR California Department of Industrial Relations

FEM fire equipment mechanic

HR human resources

IARC International Agency for Research on Cancer

LA Los Angeles

NIOSH National Institute of Occupational Safety and Health

PAH polycyclic aromatic hydrocarbon

PBZ personal breathing zone PCB polychlorinated biphenyls

PCE perchloroethylene/tetrachloroethylene

PCP pentachlorophenol

PEL Permissible Exposure Limit
PPE personal protective equipment

RFP request for proposal SDS safety data sheet

SEG similar exposure group

#### **1** Introduction and Summary

In October 2019, Assembly Bill (AB) 1400 was signed into law requiring the California Department of Industrial Relations (DIR) Commission on Health and Safety and Worker's Compensation (CHSWC) to submit a study to the Legislature, the Occupational Safety and Health Standards Board, and the Los Angeles County Board of Supervisors on the risk of exposure to carcinogenic materials and incidence of occupational cancer in mechanics who repair and clean firefighting vehicles. Specifically, AB 1400 required that the study include:

- 1. Site visits at a representative sample of facilities, including, but not limited to, facilities in the County of Los Angeles, where firefighting equipment is cleaned and repaired.
- 2. Interviews and surveys with current and former mechanics of firefighting equipment in a sample of facilities regarding the frequency of exposure to potential carcinogens, use and availability of safety equipment, and experience or knowledge of cancer incidence among current or former mechanics who cleaned or repaired firefighting equipment.
- 3. A measurement of the current levels of carcinogenic material exposure to mechanics who repair and clean firefighting vehicles in the County of Los Angeles and other facilities included in the study, in order to develop a baseline of carcinogenic material exposure.

The minimum scope of services, as stated in the request for proposal (RFP) #4479 "Assessment of Risk of Carcinogens Exposure and Incidents of Occupational Cancer among Mechanics and Cleaners of Firefighting Vehicles", further outlined the study requirements, including:

- 1. Conduct a thorough literature review of carcinogen exposures in fire stations and for firefighting vehicle mechanics and cleaners.
- 2. Site visits at a representative sample of facilities, including, but not limited to, facilities in the County of Los Angeles where firefighting equipment is cleaned and repaired;
- 3. Interviews and surveys with current and former mechanics of firefighting equipment in a sample of facilities regarding the frequency of exposure to potential carcinogens, use and availability of safety equipment, and experience or knowledge of cancer incidence among current or former mechanics who cleaned or repaired firefighting equipment. In particular, a detailed questionnaire administered in person to current and former mechanics and cleaners of firefighter equipment combined with industrial hygiene surveys should be employed as part of the study;
- 4. A measurement of the current levels of exposure to (unspecified) carcinogenic material among mechanics who repair and clean firefighting vehicles in the County of Los Angeles and other facilities included in the study, in order to develop a baseline of carcinogenic material exposure;

5. In addition to conducting an assessment of the risk of carcinogens exposure and incidents of occupational cancer among mechanics and cleaners of firefighting vehicles, the vendor will respond to DIR requests for technical assistance on legislative and/or regulatory issues related to the assessment of carcinogen exposures to mechanics and cleaners of firefighting equipment.

ToxStrategies, Inc., (ToxStrategies) was contracted by CHSWC, to conduct the study as outlined in AB 1400 and RFP #4479. This report summarizes the effort to complete the study since June 2020.

#### 1.1 Summary of Study Activities

The following activities were performed to implement this study to address the questions raised in the legislation.

Task 1: Structured Literature Review of Potential Occupational Exposures and Cancers among Mechanics Who Repair and Clean Firefighting Vehicles — summary of available scientific literature on exposure to chemical carcinogens and studies of cancer risk among fire mechanics

- Task 2: Qualitative Exposure Assessment site visits at representative facilities
- Task 3: Epidemiology Feasibility Study feasibility study of cohort enumeration
- Task 4: Quantitative Exposure Assessment measurement of current occupational exposures to carcinogens
- Task 5: Cancer Risk Assessment calculation of theoretical excess cancer risks from occupational exposure to carcinogens

The subsequent sections of this report summarize the information obtained and results and conclusions developed for each of these tasks.

#### 1.2 Summary of Overall Study Results

While epidemiologic studies of cancer risk among firefighters and mechanics have been reported, no study to date has evaluated the risk of cancer among mechanics who repair and clean firefighting vehicles. The number of fire mechanics in Los Angeles (LA) County alone, with records dating back to 1975, is insufficient to evaluate the risk of cancer among fire mechanics in an epidemiological study. However, such a study may be possible if the potential cohort was expanded to include fire mechanics in other large counties in California.

In addition to the epidemiology feasibility study and consistent with the RFP, ToxStrategies performed a detailed qualitative (e.g., site visits, interviews and surveys with current and former fire mechanics) and quantitative (e.g., measurements of carcinogenic material) evaluation to assess LA County fire mechanics' occupational exposure to

chemical carcinogens. In September 2020, site visits were conducted at a representative sample of facilities in LA County, where firefighting equipment is cleaned and repaired:

- 1. Air Operations in Pacoima,
- 2. Breathing Apparatus Shop in Pacoima,
- 3. Eastern Fire Shop in Los Angeles, and
- 4. North County Fire Shop & Fire Station 129 in Lancaster

In November 2020, sampling of surface residues on fire equipment and personal breathing zone (PBZ) air samples were collected over two days at Air Operations, the Breathing Apparatus Shop, and the Eastern Fire Shop. Although the samples were collected on a single day at each location, worst-case exposure conditions were sampled to the extent possible (e.g., the most visibly contaminated surfaces were sampled). Toxicity criteria developed by California regulators were used in the assessment to estimate the theoretical increased cancer risk from the measured exposures.

Exposures to surface residues resulted in risks less than 1 in 10,000, which is the regulatory benchmark set by the National Institute of Occupational Safety and Health (NIOSH). The health risk assessment found that airborne exposures among fire mechanics in each of the studied operations resulted in a theoretical increased cancer risk that exceeds the NIOSH risk benchmark, and as such, improvements to working conditions in accordance with the NIOSH hierarchy of controls to reduce chemical exposures is recommended.

# 2 Structured Literature Review of Potential Occupational Exposures and Cancers among Mechanics Who Repair and Clean Firefighting Vehicles (Task 1)

The purpose of Task 1, Structured Literature Review, was to identify and review relevant published literature to understand the state of the science with respect to exposure to chemical carcinogens associated with repairing and cleaning firefighting vehicles and equipment, as well as studies of cancer risk among fire mechanics.

The objectives of the structured literature review were as follows:

- 1. Identify carcinogenic chemicals of potential concern (COPCs) for mechanics who repair and clean firefighting vehicles and equipment
- 2. Identify epidemiologic studies evaluating the risk of cancer among mechanics who repair and clean firefighting vehicles and equipment.

For the first objective of identifying studies reporting carcinogenic exposures experienced by fire mechanics, no occupational chemical exposure studies explicitly focused on fire mechanics, fire equipment cleaners, or firefighting vehicle maintenance workers. However, nine industrial hygiene studies presented data for fire stations and firefighting vehicles and/or gear, which likely overlap with the occupational exposures of fire

mechanics who repair and clean firefighting vehicles. Figure 1 presents a flow diagram showing the sequential search results of the literature search.

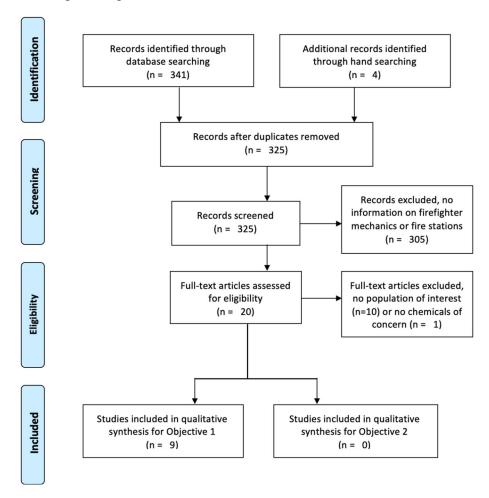


Figure 1. Literature search flow diagram.

The chemical carcinogens evaluated in these studies, which were included in the quantitative exposure assessment (Task 4), were benzene, diesel exhaust, polycyclic aromatic hydrocarbons (PAHs), crystalline silica, ethylbenzene, polychlorinated biphenyls (PCBs), acetaldehyde, formaldehyde, and styrene. A recent study, identified after the literature search was completed, identified chlorinated dioxins/furans; thus, chlorinated dioxins/furans were also included in the quantitative exposure assessment.

For the second objective of identifying studies of cancer risks or rates among fire mechanics, no epidemiologic studies were identified. A supplemental literature search was conducted to identify risk of cancer in the related occupations of firefighting and automotive maintenance and repair. Though a more thorough systematic review is necessary to fully characterize the risks in these occupations, our preliminary review of the International Agency for Research on Cancer (IARC) monographs and the supplemental literature demonstrated that certain cancers have been reported as increased in firefighters

and automotive mechanics as shown in Table 1. While the studies of firefighters and automotive mechanics provide additional insight into the risks associated with these related occupations, the results of these studies may not be generalizable to the experience of fire mechanics.

Table 1. Reported cancer types potentially associated with occupation in firefighting and automotive maintenance and repair

| Cancer Site or Type    | Secondary<br>Literature,<br>Auto Mechanics | Nordic Cohorts,<br>Auto Mechanics | IARC, Firefighters |
|------------------------|--------------------------------------------|-----------------------------------|--------------------|
| Bladder                | X                                          |                                   |                    |
| Lung                   |                                            | X                                 |                    |
| Mesothelioma           |                                            | X                                 |                    |
| Non-Hodgkin's Lymphoma |                                            | X                                 | X                  |
| Pancreas               |                                            | X                                 |                    |
| Prostate               |                                            |                                   | X                  |
| Testicular             |                                            |                                   | X                  |
| Ureter and Urethra     |                                            | X                                 |                    |

The findings from Task 1 structured literature review were informative with respect to potential chemical exposures that were evaluated in the qualitative (Task 2) and quantitative exposure assessments (Task 4).

The Task 1 report is attached as Appendix A.

#### **3** Qualitative Exposure Assessment (Task 2)

The purpose of Task 2, Qualitative Exposure Assessment, was to determine similar exposure groups (SEGs) among the fire mechanics and prioritize/define the scope of the quantitative exposure assessment based on a risk ranking that incorporates the relative magnitude of the exposure potential, specifically for carcinogens<sup>1</sup>. Each job task was characterized in terms of relevant chemical product usage information and/or fire residues encountered. The overall risk ranking was determined based on an exposure rating and health effect rating of the product and/or residue encountered by fire mechanics, by job task. Figure 2 shows the matrix that combines the exposure rating and health effect rating.

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AIHA (American Industrial Hygiene Association). 2015. A Strategy for Assessing and Managing Occupational Exposures. 4th Edition. American Industrial Hygiene Association, Falls Church, VA.

|                 | Health Effect Rating |     |          |      |           |
|-----------------|----------------------|-----|----------|------|-----------|
| Exposure Rating | 0                    | 1   | 2        | 3    | 4         |
| 4               |                      |     |          |      | Very High |
| 3               |                      |     |          | High |           |
| 2               |                      |     | Moderate |      |           |
| 1               |                      | Low |          |      |           |
| 0               | Trivial              |     |          |      |           |

Figure 2. Risk ranking matrix

Task 2 was accomplished through site visits to representative facilities, interviews and surveys with current and former fire mechanics, review of safety data sheets (SDSs) for chemical products used by the fire mechanics and compilation of relevant toxicity data to determine which chemical substances are considered carcinogens and the availability of criteria to quantitatively evaluate the potential cancer risk from exposure to the substances.

Through email correspondence with the American Federation of State, County & Municipal Employees (AFSCME) Local 119 representatives, ToxStrategies identified the County of Los Angeles Fire Department mechanic classifications and three main sites of operation. The fire mechanic classifications (SEGs) are (1) Equipment Maintenance Worker, (2) Fire Equipment Mechanic (FEM), (3) Helicopter Mechanic, and (4) Helicopter Maintenance Inspector. We also recognized a category of Field Mechanics, who work across the county at local fire stations and at locations where fire equipment is dispatched, including wildfires. These mechanics do not work at the main facilities but have similar potential for exposure, because they contact the residue from fires that is on the surface of the equipment.

ToxStrategies conducted site visits at the three main sites of operation, which included:

- Eastern Fire Shop, located at 1104 N Eastern Avenue, Los Angeles, 90063
- North County Fire Shop, located at 42110 6<sup>th</sup> Street West, Lancaster, 93534
- Pacoima Air Operations & Breathing Apparatus (BA) Shop, located at 12605
   Osborne Street, Pacoima 91331.

During the visits, ToxStrategies conducted 12 in-person interviews with current LA County fire mechanics and fire mechanic supervisors. We met with mechanics from all job classifications at all three locations to discuss their work activities and potential exposures. Three virtual interviews were conducted with current and former LA County fire mechanics and one virtual interview was conducted with a fire mechanic from the Menlo

Park Fire Protection District in Northern California. Continued correspondence/data-gathering occurred throughout the study period with AFSCME representatives.

The purpose of the site visits (walk-around surveys) and personnel interviews (in-person and conference calls that occurred after the in-person site visits) was to gather information regarding chemical exposures of fire mechanics by recording observations of potential sources of exposures to chemical carcinogens at each location, as well as the manner in which these exposures may occur. The survey approach included identifying chemical agents in the workplace and discussing the overall job and specific work tasks conducted by each of the fire mechanic classifications. The survey goals were to understand how and when workers are exposed to the chemical agents, ascertain information regarding the availability and use of exposure controls (personal protective equipment [PPE], engineering/administrative controls, work practice controls), and discuss the evolution of chemical usage and work practices over time.

ToxStrategies reviewed SDSs used at the Eastern Fire Shop and the North County Fire Shop. However, SDSs for products used at the Pacoima Air Operations and the Breathing Apparatus Shop were not available; therefore, chemical usage information was obtained through the site visits and personnel interviews only.

The risk ranking matrix (Figure 2 above) was used to identify and prioritize high-risk chemical exposures, which allowed ToxStrategies to target the DIR resources for Task 4 and focus on potential exposures with the highest potential chemical exposures to carcinogens.

Some specific concerns identified by the fire mechanics, that were also prioritized as highrisk chemical exposures, included:

- Diesel exhaust at the Eastern and North County Fire Shops
- Smoke and fire residue exposures at a wildfire base camp
- Fire residues on the underside and inside the mechanical compartments of the fire truck, including fire equipment (e.g., fire hoses)
- Hexavalent chromium residue on aircraft engines and other aircraft parts at Air Operations
- Fire residues on the aircraft at Air Operations
- Jet A fuel exhaust in the hangar at Air Operations
- Fire residues on the breathing apparatus and fire hoses at the Breathing Apparatus Shop.

Further, ToxStrategies identified strong gasoline odors when entering the small engine repair shop at the Breathing Apparatus Shop during one of the site visits. Therefore, this area was prioritized for the quantitative exposure assessment (Task 4).

Job titles, locations, tasks and associated chemicals and qualitative exposure ranking are presented in Table 2. The chemicals identified in Task 2 were reviewed and updated prior

to collecting and analyzing samples in Task 4. Table 2 below shows the updated list as included in Task 4.

Table 2. Job titles, tasks, and relevant chemical carcinogens identified for quantitative analysis

|                                                                                    |                                                                                                                                                                                          |                                                                                                                       | Surface Wipe Sample                                                                             |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Job Titles/Location                                                                | Tasks                                                                                                                                                                                    | PBZ Sample Chemicals                                                                                                  | Chemicals                                                                                       |
|                                                                                    | Very                                                                                                                                                                                     | High Exposure Ranking                                                                                                 |                                                                                                 |
| Fire Equipment<br>Mechanic at Wildfire<br>Base Camp                                | Fire equipment repair in the field                                                                                                                                                       | Acetaldehyde Benzene Ethylbenzene Formaldehyde Polycyclic aromatic hydrocarbons (PAHs) Naphthalene Diesel particulate | Arsenic Chlorinated dioxins/furans Lead PAHs Pentachlorophenol Polychlorinated biphenyls (PCBs) |
| Helicopter<br>Mechanic/Helicopter<br>Maintenance<br>Inspector at Air<br>Operations | Heavy maintenance on<br>aircraft, including the<br>task of oil-leak checks                                                                                                               | Crystalline Silica<br>Hexavalent chromium                                                                             | Arsenic Hexavalent chromium Chlorinated dioxins/furans Lead PAHs PCBs                           |
|                                                                                    | Hi                                                                                                                                                                                       | gh Exposure Ranking                                                                                                   |                                                                                                 |
| Equipment Maintenance Worker at Breathing Apparatus Shop Location                  | Repair and tune-up of power equipment and rescue tools                                                                                                                                   | Acetaldehyde Benzene Ethylbenzene Formaldehyde Naphthalene Styrene                                                    | Arsenic Chlorinated dioxins/furans PAHs PCBs Pentachlorophenol Lead                             |
|                                                                                    |                                                                                                                                                                                          | erate Exposure Ranking                                                                                                | 1                                                                                               |
| Helicopter<br>Mechanic/Helicopter<br>Maintenance<br>Inspector at Air<br>Operations | 1) painting/priming on the interior and exterior of the aircraft, (2) sanding helicopter blades, (3) painting helicopter blades, and (4) painting using aerosol paints and epoxy primers | 4-Chlorobenzo-trifluoride Ethylbenzene Hexavalent chromium Methylene chloride                                         |                                                                                                 |
| Helicopter Mechanic/Helicopter Maintenance Inspector at Air Operations             | Intermediate aircraft maintenance                                                                                                                                                        | Hexavalent chromium Naphthalene Benzene Ethylbenzene                                                                  | Arsenic Chlorinated dioxins/furans Hexavalent chromium Lead PAHs PCBs                           |
| Equipment Maintenance Worker at Breathing Apparatus Shop Location                  | Repair and test fire hoses                                                                                                                                                               |                                                                                                                       | Arsenic<br>Lead<br>PAHs                                                                         |

| Job Titles/Location                                                                                | Tasks                                                      | PBZ Sample Chemicals                                                                                                                                    | Surface Wipe Sample<br>Chemicals                                                                                  |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Fire Equipment<br>Mechanic at Eastern<br>Fire Shop or North<br>County Fire Shop or<br>in the field | General maintenance<br>and repair of the fire<br>apparatus | Benzene Diesel particulate Ethylbenzene Naphthalene N,N-dimethyl-para-toluidine Tetrachloroethylene Welding fume metals (including hexavalent chromium) | Arsenic Chlorinated dioxins/furans PAHs PCBs Pentachlorophenol Lead Bulk sample of fiberglass strips for asbestos |

The Task 2 report is attached as Appendix B.

#### 4 Epidemiology Feasibility Study (Task 3)

The objective of Task 3 was to determine the feasibility of conducting an epidemiologic evaluation of risk of cancer in fire mechanics. ToxStrategies staff interviewed LA County fire equipment mechanics and a representative from LA County Fire human resources (HR) to determine the availability of information needed to conduct an epidemiologic study. The feasibility study consisted of four steps:

- Exposure verification (identify fire mechanics). Employees considered to be fire mechanics could be selected using a list of specific job classification codes obtained during a ToxStrategies site visit. Fire mechanics could be identified using these codes through LA County personnel records, which date back to 1975.
- Outcome ascertainment (track fire mechanics for cancer). Fire mechanics could be tracked for incidence cancer diagnoses using the California Cancer Registry, from 1988 forward (1972 forward if diagnosed in LA County), or for death due to cancer using the National Death Index, from 1979 forward. Employees could be linked to these registries using their social security number and/or date of birth, both of which are available in personnel records.
- Cohort enumeration (determine size of cohort). Using two systems of personnel records, LA County Fire HR determined there were 180 individual employees considered to be fire mechanics from September 1975 to January 2021.
- Confounding variables (evaluate characteristics that may confound the
  relationship between occupation and cancer). Fire mechanics complete a preemployment physical at an occupational health clinic, where records of
  smoking history, alcohol consumption, and medical history are likely available.
  These records would need to be obtained from the occupational health clinic
  directly. Some variables may also be available in the registries.

While it would be feasible to assemble a cohort of fire mechanics in LA County and track participants' cancer diagnoses, the number of employees within this potential cohort would

not likely be large enough to detect any significant increased risk of cancer. If the cancer risk in fire mechanics was similar to that of firefighters, approximately 1,000 fire mechanics, with an average of 10 years of follow-up each, would be necessary to detect a statistically significant increased risk of cancer. Evaluating the potential of expanding the cohort to fire mechanics throughout the State of California is recommended as a future activity.

The Task 3 report is attached as Appendix C.

#### **5** Quantitative Exposure Assessment (Task 4)

The purpose of Task 4, Quantitative Exposure Assessment, was to conduct exposure monitoring of workers for airborne chemicals, as well as chemical analysis of surface residues, based on the findings from Tasks 1 and 2. Samples from each SEG were selected for PBZ air sampling and surface wipe sampling of equipment.

The chemical carcinogens identified during the literature review task (Task 1; Section 2 above) and selected for PBZ air sampling and/or surface wipe sampling were benzene, diesel exhaust, PAHs, crystalline silica, ethylbenzene, PCBs, acetaldehyde, formaldehyde, styrene, and chlorinated dioxins/furans.

The job tasks that were identified during the qualitative exposure assessment (Task 2; Section 3 above) as ranking moderate, high, and very high were selected for PBZ air sampling and/or surface wipe sampling. Further, ToxStrategies quantitatively assessed each of the fire mechanics' concerns listed in Section 3 above, with the exception of the smoke and fire residue exposures at a wildfire base camp since there were no active fires during the month of our sampling events and spray painting of aircraft because that activity is infrequent and not scheduled for the days of the assessment.

ToxStrategies collected PBZ air samples and surface wipe samples on November 3, 2020 at Air Operations (Pacoima) and the Breathing Apparatus Shop (Pacoima), and November 4, 2020 at the Eastern Fire Shop (Los Angeles). Please note that ToxStrategies did not conduct quantitative sampling at the North County Fire Shop (Lancaster) because fire equipment mechanics perform similar job tasks at both sites, and the North County Fire Shop is a much smaller facility than the Eastern Fire Shop. Therefore, the results obtained at the Eastern Fire Shop were assumed to be representative of the North County Fire Shop. To stay within the constraints of the budget and schedule and to minimize potential exposures between sampling personnel and fire mechanics in light of the COVID-19 in the fall 2020, sampling was conducted on one day at each of the locations.

Sampling was conducted with a focus on the highest exposure opportunities. For example, a fire engine was running inside the Eastern Fire Shop adjacent to where an area PBZ air sample was being collected; PBZ air samples were collected where gasoline odors were observed at the small engine repair shop (at the Breathing Apparatus Shop); surfaces were sampled where the highest amount of residue was observed; and surfaces were sampled on aircraft and fire trucks that had recently been in a wildfire.

Table 3 provides an overview of the PBZ sampling and analyses, and Table 4 provides an overview of the surface wipe samples and analyses. The quantitative exposure results from Task 4 were used subsequently in the cancer risk assessment (Task 5). In addition, four bulk samples of vermiculite-coated fiberglass strips used to wrap the fire apparatus exhaust were collected and analyzed for asbestos. Asbestos was not detected in any samples.

Table 3. Summary of Air Samples and Analyses<sup>1</sup> (PBZ<sup>2</sup> and Area Samples)

| Location                                                        | Cr(VI) | Benzene | Acetal-<br>dehyde | Formal-<br>dehyde | PCE | Diesel<br>Partic-<br>ulates <sup>3</sup> | Welding<br>Fumes <sup>4</sup>      | Chemicals N                                | Not Detected <sup>5</sup>                    |
|-----------------------------------------------------------------|--------|---------|-------------------|-------------------|-----|------------------------------------------|------------------------------------|--------------------------------------------|----------------------------------------------|
| Air Operations –<br>Maintenance/Repair -<br>PBZ                 | 1/8    | 0/6     | 6                 | _                 | _   | _                                        | _                                  | (ethylbenzene                              | /6<br>e, naphthalene,<br>ne silica)          |
| Air Operations - Area                                           | _      | 0/2     |                   | _                 |     |                                          |                                    |                                            | /2<br>e, naphthalene)                        |
| Breathing Apparatus<br>Shop - Small Engine<br>Repair Shop - PBZ | _      | 2/2     | 2/2               | 2/2               |     |                                          |                                    | (ethylbenzene                              | /2<br>e, naphthalene,<br>gene)               |
| Eastern Fire Shop -<br>Maintenance/Repair -<br>PBZ              | _      | 0/6     |                   | _                 | 6/6 | 1/6                                      |                                    | 0/6<br>(ethyl-<br>benzene,<br>naphthalene) | 0/5<br>(N,N-<br>dimethyl-para-<br>toluidine) |
| Eastern Fire Shop-<br>Welding - PBZ                             | 0/2    |         |                   | _                 | _   |                                          | 1/2<br>(cobalt)<br>2/2<br>(nickel) | (arsenic, beryl                            | /2<br>lium, cadmium,<br>ad)                  |
| Eastern Fire Shop -<br>Area                                     | _      | 0/2     | _                 | _                 | _   | 0/2                                      | _                                  |                                            | /2<br>e, naphthalene)                        |
| <b>Total Samples</b>                                            | 10     | 18      | 2                 | 2                 | 6   | 8                                        | 4                                  | 5                                          | 57                                           |

#### Notes:

- 1. Ratio indicates number of detections over total number of samples analyzed.
- 2. Each PBZ sample represents an 8-hour time-weighted average.
- 3. Diesel particulates measured as elemental carbon
- 4. Only carcinogenic welding fume chemicals are presented.
- 5. Chemicals not detected in any samples.
- 6. "—" indicates samples were not analyzed for this chemical.

#### Abbreviations:

Cr(VI) – hexavalent chromium, PCE – tetrachloroethylene.

Table 4. Summary of Surface Samples and Analyses<sup>1</sup>

| Location                                                                        | PAHs | Arsenic | Lead  | Cr(VI) | PCBs | Dioxins/<br>Furans | РСР |
|---------------------------------------------------------------------------------|------|---------|-------|--------|------|--------------------|-----|
| Air<br>Operations –<br>Firehawk and<br>Bell412<br>aircraft<br>samples           | 0/12 | 0/12    | 10/12 | 2      | _    | _                  | _   |
| Air<br>Operations –<br>Firehawk and<br>Bell412<br>aircraft<br>engine<br>samples |      |         |       | 6/6    | 2/2  | 2/2                |     |
| Air<br>Operations –<br>Mastinox-<br>coated area<br>on Bell412                   | _    | _       |       | 2/2    | _    | _                  | _   |
| Breathing<br>Apparatus<br>Shop - Air<br>packs                                   | 3/63 | 0/6     | 6/6   | _      | 2/2  | 2/2                | 0/2 |
| Breathing<br>Apparatus<br>Shop - Fire<br>hoses                                  | 0/6  | 0/6     | 6/6   | _      | _    | _                  | _   |
| Eastern Fire<br>Shop - Fire<br>Apparatus                                        | 6/6  | 0/6     | 6/6   | _      | 6/6  | 6/6                | 0/6 |
| <b>Total Samples</b>                                                            | 30   | 30      | 30    | 8      | 10   | 10                 | 8   |

#### Notes:

- 1. Ratio indicates number of detections over total number of samples analyzed.
- 2. "—" indicates samples were not analyzed for this chemical.
- 3. PAHs were only detected on training air packs.

#### Abbreviations:

PAHs – polycyclic aromatic hydrocarbons (16 chemicals including naphthalene), Cr(VI) – hexavalent chromium, PCBs – polychlorinated biphenyls (162 congeners or congener groups), Dioxins/Furans – chlorinated dioxins and furans (17 congeners,) and PCP – pentachlorophenol

The Task 4 report is attached as Appendix D.

#### 6 Cancer Risk Assessment (Task 5)

The Task 5 report provides a quantitative health risk assessment of potential increased cancer risk associated with exposure to carcinogens in the workplace. This risk assessment was prepared based on regulatory guidance used in the State of California for the purpose of assessing exposure and risk. Site-specific information gathered as part of Task 2,

qualitative exposure assessment, was used to refine the exposure assumptions used in the risk assessment calculations.

The cancer risk assessment is an estimate of the theoretical increased risk of developing cancer as a result of exposure to chemicals present in the workplace. This approach involves varying degrees of conservatism and ensures that cancer risk is not underestimated, which makes it probable that the estimated risk will be overestimated. It is important to consider that these risks are theoretical because they are not measured directly among fire mechanics, which could only be done through use of an epidemiology study (as discussed in Task 3).

Consistent with regulatory guidance, the risk assessment was performed in a series of four steps:

#### Hazard Identification

During Task 4 quantitative exposure assessment, ToxStrategies conducted exposure monitoring of workers in each similar SEG for airborne chemicals, via PBZ air samples, as well as chemical analysis of surface residues via surface wipe samples. Samples were not collected for the field-assigned fire equipment mechanic at a wildfire base camp or for the helicopter maintenance inspector conducting painting/priming/sanding of aircraft parts because those activities were not on-going when sampling was performed.

Acetaldehyde, benzene, cobalt, formaldehyde, hexavalent chromium, nickel, and tetrachloroethylene were detected in at least one PBZ air sample. Hexavalent chromium, lead, PAHs, PCBs, and dioxins/furans were detected in at least one surface wipe sample. These chemicals were all considered to potentially increase the risk of cancer and were quantitatively evaluated in the risk assessment.

#### Exposure Assessment

In Task 2 qualitative exposure assessment, ToxStrategies provided an exposure ranking for each SEG exposed to carcinogens identified in the workplace in order to focus the Task 4 quantitative exposure assessment to those exposures (job tasks) that may pose the highest risk. Three primary scenarios were evaluated quantitatively in the risk assessment.

- Helicopter mechanic performing intermediate and heavy maintenance on the aircraft at Air Operations;
- Equipment maintenance worker performing repair and tune-up of power equipment at the small engine repair shop (Breathing Apparatus Shop); and
- FEM performing maintenance and repair of the fire apparatus at the Eastern Fire Shop.

Four additional SEGs, based on specific activities or contact with potentially contaminated materials were also included:

• Mastinox contact by the helicopter mechanic at Air Operations;

- Welding/grinding/cutting activities by the FEM at the Eastern Fire Shop;
- Repair and tune-up of the air packs at the Breathing Apparatus Shop; and
- Fire hose repair by the equipment maintenance worker at the fire hose repair shop (Breathing Apparatus Shop).

Exposure assumptions from regulatory guidance or based on site-specific information obtained during interviews during Task 2 were assigned to each SEG for the purpose of evaluating inhalation, dermal contact, and incidental ingestion exposures. Concentrations at the point of exposure were developed from the Task 4 data using averages when multiple samples were collected and maximum values when a few samples were collected. If an analyte was not detected in any samples at a location, it was not considered further in the risk assessment.

The air concentrations in each of these locations were below Permissible Exposure Limits (PELs), legal limits below which workers are allowed to be exposed; however, PELs are not always established to be protective of an increased cancer risk.

#### Toxicity Assessment

Toxicity criteria quantifying the relationship between chemical exposure and theoretical increased cancer risk were identified from regulatory references. Preference was given to criteria developed by a California regulatory agency or health agency. Other chemical-specific factors such as an adjustment to toxicity criteria based on ingestion exposures were made to quantify risk from dermal exposure. Some chemicals did not have regulatory toxicity criteria and were evaluated qualitatively.

#### Risk Characterization

Risk characterization is the integration of the exposure assessment and toxicity assessment to provide a quantitative estimate of theoretical risk. For the purpose of this risk assessment, excess cancer risks calculated to be less than 1 in 10,000 (recently adopted by the NIOSH) were considered *de minimus*.

Exposure via dermal contact and incidental ingestion exposure were much lower than inhalation exposure for all SEGs, and lower than the target criteria set by NIOSH. Theoretical excess cancer risks ranged from 0.0009 in 10,000 for fire hose repair to 0.2 in 10,000 for contact with Mastinox.

Based on the risk assessment process described herein, theoretical risks for inhalation exposure for the primary SEGs were as follows, with the primary chemical noted in the parentheses:

- 20 in 10,000 (0.2%) at Air Operations (hexavalent chromium)
- 30 in 10,000 (0.3%) at the Breathing Apparatus Shop, specifically measured at the small engine repair shop (benzene)
- 400 in 10,000 (4%) at the Eastern Fire Shop (tetrachloroethylene).

It is noteworthy that these risk estimates are based on current sampling data and may not be reflective of past exposures; however the assessment assumes that exposure occurs for a working lifetime of 45 years. As worker safety and health practices typically improve with time, it is reasonable to assume that exposures in the past may have been higher and different than those quantified herein.

In any risk assessment, estimates of potential carcinogenic risk are based on assumptions regarding exposure and toxicity, which have numerous associated uncertainties. Where possible, conservative assumptions were used to address uncertainty such that risks associated with the chemical exposures evaluated in this study are expected to be overestimated.

It is also noteworthy that while the theoretical increased cancer risks calculated for inhalation exposures exceed the current NIOSH benchmark of 1 in 10,000, these risks are far lower than that measured among firefighters. Increased cancer risks among firefighters have been documented in epidemiological studies. The IARC Working Group's analysis of firefighters found that the risk of testicular cancer was increased by  $\sim$ 50%, the risk of prostate cancer by  $\sim$ 30% and the risk of non-Hodgkin's lymphoma by  $\sim$ 20%². As discussed in Task 1, similar studies of fire mechanics have not been performed, but the feasibility of such was assessed in Task 3 of this project.

To reduce theoretical cancer risk for the exposures identified above, a variety of control measures consistent with the NIOSH hierarchy of controls (eliminate, substitution, engineering controls, administrative controls, and use of PPE) could be considered. Examples include:

- Eliminate tetrachloroethylene-containing products, replacing them with products that do not contain carcinogens.
- Increase ventilation in the small engine repair shop to reduce benzene air concentrations.
- Identify work practices at Air Operations that increase the potential for airborne hexavalent chromium releases, and modify practices/procedures to reduce the release.

The Task 5 report is attached as Appendix E.

#### 7 Technical Assistance to the DIR (Task 6)

Task 6 may include analyzing public comments, explaining the rationale for specific policy recommendations, and disseminating the study findings to the Governor, Legislature,

<sup>&</sup>lt;sup>2</sup> IARC (International Agency for Research on Cancer). 2010. IARC Monographs on the evaluation of carcinogenic risks to humans, Volume 98, Painting, firefighting, and shiftwork. Occupational Cancer Research Centre, <a href="https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/">https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/</a>.

Occupational Safety and Health Standards Board, Los Angeles County Board of Supervisors, and stakeholders in the workers' compensation system.

#### **APPENDIX A**

Task 1: Structured
Literature Review of
Potential Occupational
Exposures and Cancers
among Mechanics Who
Repair and Clean
Firefighting Vehicles

# Task 1: Structured Literature Review of Potential Occupational Exposures and Cancer among Mechanics Who Repair and Clean Firefighting Vehicles

**FEBRUARY 25, 2021** 

## **Tox** Strategies

Innovative solutions
Sound science

# Task 1: Structured Literature Review of Potential Occupational Exposures and Cancer among Mechanics Who Repair and Clean Firefighting Vehicles

**FEBRUARY 25, 2021** 

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#### 1 Background and Rationale

The International Agency for Research on Cancer (IARC) and recent epidemiologic studies have suggested that firefighters may be at increased risk for certain cancers due to their occupational exposures to carcinogens found in fire gases and smoke (e.g., benzene, polycyclic aromatic hydrocarbons [PAHs], cadmium, crystalline silica [IARC, 2010]) as well as exposures to other agents (e.g., diesel exhaust [IARC, 2010]) (e.g., IARC, 2010; Tsai et al., 2015; LeMasters et al., 2006). Since January 1, 2012, firefighters have been included in the California Cancer Presumption for worker compensation purposes (California Labor Code §3212.1). With these benefits, a firefighter who develops cancer can be awarded compensation for medical treatment and disability benefits, if the individual demonstrates that he or she was exposed to a carcinogen during the course of their employment. In comparison, mechanics who repair and clean firefighting vehicles and equipment are not covered by this worker compensation program. Repairing and cleaning firefighting vehicles and equipment (trucks, helicopters, axes, hoses, etc.) at a fire station or offsite at a fire event may expose the mechanics to fire-related carcinogens, similar to those of the firefighters. However, chemical data for fire mechanics are not readily available, and their occupational exposures are not well characterized, limiting the evaluation of their potential cancer risks.

As a result, California Assembly Bill (AB) 1400 was created to define the fire mechanic's risk of exposures to carcinogens in the course of employment. Specifically, AB 1400, Section 77.7, was added to the Labor Code on October 11, 2019, and requires the Commission on Health and Safety and Workers' Compensation (CHSWC), in partnership with the County of Los Angeles and relevant labor organizations, to submit a study to the Legislature, the Occupational Safety and Health Standards Board, and the Los Angeles County Board of Supervisors "on the risk of exposure to carcinogenic materials and incidence<sup>2</sup> of occupational cancer in mechanics who repair and clean firefighting vehicles." The study components include:

- Site visits at representative facilities in Los Angeles County, California
- Interviews and surveys with current and former fire mechanics

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California Legislative Information. 2019. AB-1400 Employment safety: Firefighting equipment: Mechanics (2019–2020). Bill Analysis. Senate Committee on Labor, Public Employment and Retirement. Hearing Date: July 10, 2019.

As discussed in Section 6, insufficient information currently exists to assess the incidence rate of cancer among firefighting mechanics. For this project, we will evaluate the available information and assess the feasibility of generating the data that could potentially be used in a future epidemiologic study.

California Legislative Information, 2019. AB-1400 Employment safety: Firefighting equipment: Mechanics (2019-2020). Assembly Bill No. 1400, Chapter 717, An act to add and repeal Section 77.7 of the Labor Code, relating to employee safety. October 11. <a href="https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\_id=201920200AB1400.">https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\_id=201920200AB1400.</a>

- Occupational exposure measurements of carcinogens found in the workplace, to evaluate potential exposure to carcinogenic materials
- Quantitative health risk assessment of potential increased cancer risk associated with exposure to carcinogens in the workplace.

ToxStrategies was contracted by the California Department of Industrial Relations (DIR), CHSWC, to conduct the study as outlined in AB 1400. ToxStrategies' approach to address these study components includes six tasks (provided in our proposal submitted to the DIR [ToxStrategies, Inc., 2020]):

- Task 1: Structured Literature Review—provided herein
- Task 2: Qualitative Exposure Assessment site visits at representative facilities
- Task 3: Epidemiologic assessment feasibility study of cohort enumeration
- Task 4: Quantitative Exposure Assessment measurement of current occupational exposures to carcinogens
- Task 5: Cancer risk assessment calculation of theoretical excess cancer risks from occupational exposure to carcinogens
- Task 6: Technical assistance to the DIR.

The purpose of Task 1, Structured Literature Review, is to identify and review relevant published literature to understand the state of the science with respect to exposure to chemical carcinogens associated with repairing and cleaning firefighting vehicles and equipment, as well as studies of cancer risk among fire mechanics.

The objectives, methods, results, and conclusions of Task 1, Structured Literature Review, are provided below. The remaining study tasks are described in Section 6.

#### 2 Objectives

The objectives of this structured literature review were as follows:

- 1. Identify carcinogenic chemicals of potential concern (COPCs) for mechanics who repair and clean firefighting vehicles and equipment
- 2. Identify epidemiologic studies evaluating the risk of cancer among mechanics who repair and clean firefighting vehicles and equipment.

The structured literature review results will be used to guide the activities of the latter tasks.

#### 3 Methods

Standard guidelines to conduct structured literature reviews, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, were followed in the conduct of this review (Moher et al., 2009). A protocol was developed *a priori* before the review was conducted to ensure clear documentation of methods and for transparency and reproducibility of our work (Attachment 1).

#### 3.1 Study Eligibility

The inclusion and exclusion criteria used to assess study eligibility are presented in Tables 1 and 2 for Objectives 1 and 2, respectively. English-language articles published as either peer-reviewed journal articles or conference abstracts through the date of the search (August 15, 2020), with no lower date limit, were included in the review.

Table 1. Study eligibility criteria for Objective 1: Identify carcinogenic chemicals of potential concern for mechanics who repair and clean firefighting vehicles and equipment.

|              | Inclusion Criteria                                                                                                                     | Exclusion Criteria                                                                           |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Population   | Mechanics who repair and clean firefighting vehicles                                                                                   | No exclusions                                                                                |
| Exposure     | Occupational exposures to potential chemical carcinogens                                                                               | Non-occupational exposures to chemical carcinogens; occupational exposure to non-carcinogens |
| Comparator   | General population, non-exposed worker populations (e.g., office workers within firefighting discipline), workers with lower exposures | No exclusions                                                                                |
| Outcome      | Any exposure measure or medical outcome                                                                                                | No exclusions                                                                                |
| Study Design | Industrial hygiene studies, exposure studies                                                                                           | Opinion pieces, reviews                                                                      |

Table 2. Study eligibility criteria for Objective 2: Identify epidemiologic studies evaluating the risk of cancer among mechanics who repair and clean firefighting vehicles and equipment

|                      | Inclusion Criteria                                                                                                                     | Exclusion Criteria                                 |  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--|
| Population           | Mechanics who repair and clean firefighting vehicles                                                                                   | No exclusions                                      |  |
| Exposure             | Occupational exposures to potential chemical carcinogens                                                                               | Non-occupational exposures to chemical carcinogens |  |
| Comparator           | General population, non-exposed worker populations (e.g., office workers within firefighting discipline), workers with lower exposures | No control group                                   |  |
| Outcome Cancer (any) |                                                                                                                                        | Non-cancer outcomes                                |  |
| Study Design         | Cohort, case-control, case studies or case series                                                                                      | Opinion pieces, reviews                            |  |

The bibliographies of relevant reviews and publications were hand-searched for additional citations of interest.

#### 3.2 Initial Literature Search

We conducted a primary literature search on June 30, 2020, in the PubMed and Embase databases to 1) identify studies on occupational exposures of mechanics who repair and clean firefighting vehicles and equipment to carcinogenic chemicals of potential concern (COPCs) and 2) identify epidemiologic studies evaluating the risk of cancer among mechanics who repair and clean firefighting vehicles and equipment, using the search syntax presented in Table 3.

Table 3. Initial search syntax used for PubMed and Embase

| Database | Search Syntax                                                                                                                                                                                                                                                                                                                           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PubMed   | ("fire station" or "fire department" or "fire fighter*" or firefighter*) AND ("truck bay" or garage or maintenance or mechanic or helicopter or vehicle or "fire truck" OR "occupational exposure") AND (exposure OR cancer[MeSH Terms] OR cancer OR carcinogen[MeSH Terms] or carcinogen*)                                             |
| Embase   | ('fire station' OR 'fire department' OR 'fire fighter*' OR firefighter*) AND ('truck bay' OR 'garage'/exp OR garage OR 'maintenance'/exp OR maintenance OR 'mechanic'/exp OR mechanic OR 'vehicle'/exp OR helicopter OR vehicle OR 'fire truck' OR 'occupational exposure'/exp OR 'occupational exposure'/exp OR cancer OR carcinogen*) |

#### 3.3 Initial Search Study Selection

Study selection was documented through DistillerSR, a specialized software program designed for tracking and managing literature reviews, resulting in a fully auditable and transparent review process. A PRISMA flow diagram is included in the results section, detailing the flow of study inclusion and exclusion at each study level.

The review of studies began at the level of title and abstract. Two reviewers screened the titles and abstracts of all de-duplicated studies resulting from the literature searches to determine their relevance for this review using the eligibility criteria (Tables 1 and 2).

Articles designated as relevant from the title and abstract review proceeded to full-text review, where two reviewers independently evaluated the full text of each article for relevance using the eligibility criteria (100% quality control [QC]). All disputes regarding study inclusion were resolved by consensus adjudication. The results were recorded, maintained, and assessed using DistillerSR.

#### 3.4 Initial Search Data Abstraction

Data were abstracted in DistillerSR for all studies deemed relevant to the review by both reviewers in the full-text review stage.

Data abstraction elements were as follows:

- **General information**, including title, authors, and year of publication
- Study characteristics:
  - By person (demographics, job, confounders)
  - By place (geography, workplace/facility)
  - By time (calendar years of conducted study and follow-up)

#### Outcomes

- **Objective 1: Occupational exposures** (chemical, exposure levels)
- Objective 2: Cancer-related outcomes (numbers, incidence rate, mortality rate, odds ratios, risk ratios, hazard ratios, standardized incidence ratios, standardized mortality ratios).

#### 3.5 Supplemental Literature Search for Cancer Outcomes

To ensure that relevant occupational studies were not missed using the original search strings (Table 3), supplemental targeted literature searching was conducted. If the cancer outcomes were not statistically significantly associated with fire mechanics, they may not be captured in the abstract or keywords of the indexed publications and thus would not have been picked up by the original searches. Given the specificity of the fire mechanics occupation and previously established lack of research for these workers, we conducted

additional searches to identify relevant literature that may not have been picked up by our original searches.

First, we reviewed the International Agency for Research on Cancer (IARC) monographs (2010) to identify cancers potentially associated with firefighting as an occupation. IARC is the World Health Organization agency that conducts and coordinates research into cancer. IARC working groups regularly review the carcinogenicity of chemicals and occupations using the available scientific literature and release monographs rating the carcinogenicity of the exposure based on the panel's scientific judgment. IARC published a monograph reviewing the carcinogenicity of firefighting in 2010 which included a list of cancers potentially associated with firefighting as an occupation (Non-Hodgkin's lymphoma, prostate cancer, and testicular cancer). Using this list of cancers, we expanded our PubMed and Embase search to identify epidemiologic studies of associations between these particular cancers and occupational groups to identify potentially missed research on cancer risk among fire mechanics (Table 4, cancer cohorts search).

Second, because there is no published IARC monograph for mechanics (automotive or other), and to provide additional context for potential cancers in the fire mechanic population, we conducted a targeted search in PubMed and Embase for epidemiologic studies of automotive mechanics and cancer (Table 4, mechanics and cancer search).

Finally, because Nordic registry-based cohort studies are known to provide robust analyses of cancer by occupation and are known to have high validity and statistical power due to large population size and complete follow-up, published literature from these cohorts was searched for fire mechanics or related occupations. Specifically, we reviewed data from Nordic cohort studies for elevated cancer risk among general mechanics, automotive mechanics, and fire mechanics (Table 4, Nordic cohorts search).

Table 4. Supplemental search syntax for PubMed

| Query          | Search Syntax                                                                                                                                                         | Date Last<br>Searched | Number of<br>Abstracts         |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------|
| Cancer cohorts | (lymphoma OR prostate OR testicular)<br>AND cancer AND "occupational<br>exposure" AND (cohort or "case-control")                                                      | August 15,<br>2020    | 668 (PubMed)<br>1,193 (Embase) |
| Mechanics      | [(automotive OR automobile OR truck OR motor vehicle OR bus OR helicopter OR garage) AND (maintenance OR repair OR mechanic) AND (occupation OR exposure) AND cancer] | August 14,            | 157 (PubMed)                   |
| and cancer     |                                                                                                                                                                       | 2020                  | 44 (Embase)                    |
| Nordic cohorts | (Nordic OR Scandinavian) AND cohort                                                                                                                                   | August 14,            | 75 (PubMed)                    |
|                | AND occupation AND cancer                                                                                                                                             | 2020                  | 67 (Embase)                    |

#### 3.6 Supplemental Study Data Abstraction

Studies identified during our supplemental searches (as described in Section 3.5) were reviewed for relevance at the title and abstract level; relevant full-text studies were searched for data for fire mechanics. Due to the volume of studies found in the cancer cohorts search (over 1,500), we used the Sciome Workbench for Interactive computer-Facilitated Text-mining (SWIFT-Review) interactive text-mining tool to further narrow these results by scanning titles, abstracts, keywords, MeSH annotations, and SWIFT-generated tags for the following syntax: "occupational AND cohort AND cancer AND occupations," "fire AND (maintenance OR cleaning OR mechanic)," and "mechanic AND cohort."

Relevant studies from the supplemental search were summarized and cited within the report but were not included in the data abstraction table, because while they provided contextual information that will help inform future work, they did not provide data that is specific to fire mechanics.

#### 4 Results

The initial database search yielded 341 publications, and hand-searching of reviews and studies included for abstraction yielded another four. After de-duplication and screening of titles and abstracts, 20 papers were deemed relevant for full-text review. Upon full-text review, nine studies were found to be relevant for abstraction of exposure data, as shown in the PRISMA flow diagram (Figure 1).

This review was limited to peer-reviewed journal articles and conference abstracts published in English. Information published in the grey literature was excluded. The results of this review are generalizable only to the geographic areas and populations included in the studies.

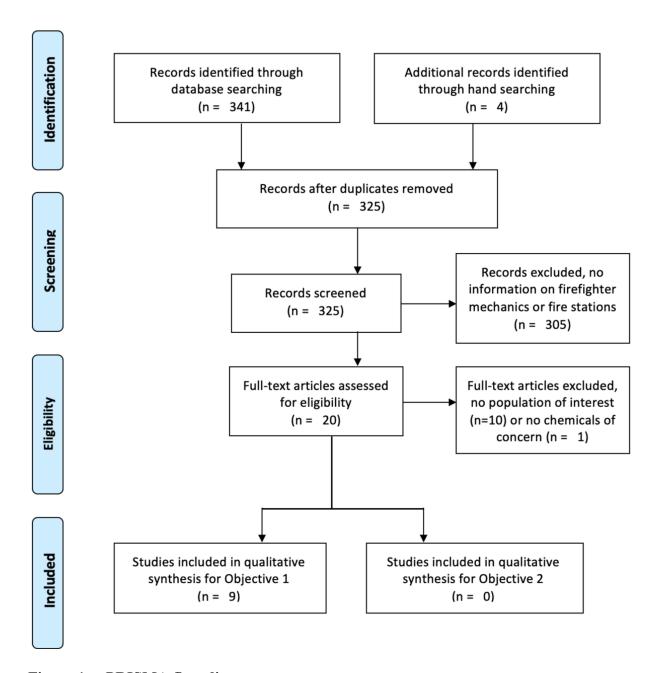


Figure 1. PRISMA flow diagram

### 4.1 Objective 1: Chemicals of Potential Concern (COPCs) for Fire Mechanics

The literature was extremely limited regarding exposures of mechanics who repair and clean firefighting vehicles and equipment (e.g., trucks, axes, hoses, etc.). No exposure studies explicitly mentioned fire mechanics, fire mechanic cleaners, or fire vehicle maintenance. However, we were able to identify nine industrial hygiene studies that presented data for exposures relating to fire stations and firefighting vehicles and/or gear, which likely overlap with exposures that fire mechanics encounter (Chung et al., 2020; Echt et al., 1995; Fent et al., 2015; Froines et al., 1987; Materna et al., 1992; Park et al., 2015; Shen et al., 2015; Shen et al., 2012; Sparer et al., 2017). The industrial hygiene studies are summarized in Table 5, including exposure findings related only to COPCs that are carcinogenic<sup>4</sup>; full study details for the nine included papers are included as Attachment 2 (Data Abstraction File). Whether a COPC was classified as a carcinogen was determined using Cal/OSHA's Hazard Communication Standard, which compiles listings from the following sources:<sup>5</sup>

- National Toxicology Program (NTP), "Report on Carcinogens" (NTP, 2016)
- International Agency for Research on Cancer (IARC) "Monographs on the Evaluation of Carcinogenic Risks to Humans" (IARC, 2020)
- Substances subject to regulation under the Occupational Carcinogen Control Act or that are regulated in Title 8, Article 110, Regulated Carcinogens (§5209, Carcinogens)
- Substances that meet the definition of "select carcinogen" in Title 8, Section 5191
- Where OSHA has included cancer as a health hazard to be considered by classifiers for a chemical covered by 29 CFR part 1910, Subpart Z.

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A carcinogen is defined as "a substance or mixture of substances which induce cancer or increase its incidence" (Appendix A to §1910.1200 – Health Hazard Criteria).

<sup>&</sup>lt;sup>5</sup> Title 8 CCR §5194, Hazard Communication

Table 5. Summary of industrial hygiene (IH) studies of potential exposures in the fire mechanics occupation

| Study                                                         | Study Period                   | Population                                                                                     | Carcinogen Exposures                                                      |  |  |  |
|---------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--|--|--|
| Firefighters' Occupational Exposure Study (FOX) publications: |                                |                                                                                                |                                                                           |  |  |  |
| Shen et al., 2015                                             | 2010–2011                      | Fire stations (IH sampling; N=20) in California                                                | Polycyclic aromatic hydrocarbons (PAHs); polychlorinated biphenyls (PCBs) |  |  |  |
| Park et al., 2015                                             | 2010–2011                      | Firefighters in southern California (biomonitoring; N=101)                                     | PCBs; organochlorine pesticides (OCPs)                                    |  |  |  |
| Shen et al., 2012                                             | 2010–2011                      | Fire stations (IH sampling; N=20) in California                                                | PAHs; PCBs                                                                |  |  |  |
| Other publications:                                           |                                |                                                                                                |                                                                           |  |  |  |
| Chung et al.,<br>2020                                         | July 2016 and<br>February 2017 | Fire stations (IH sampling; N=12) in Ontario, Canada                                           | diesel engine exhaust                                                     |  |  |  |
| Sparer et al.,<br>2017                                        | Spring 2016                    | Fire stations (IH sampling; N=4) in Boston and Arlington, Massachusetts                        | PAHs; diesel exhaust                                                      |  |  |  |
| Fent et al., 2015                                             | Not reported                   | Firefighters' personal<br>protective equipment<br>(PPE) (IH sampling)<br>in Chicago, Illinois  | benzene; 1,4-dichlorobenzene; ethylbenzene; styrene                       |  |  |  |
| Echt et al., 1995                                             | June 1992                      | Fire stations (IH sampling; N=3), locations not reported                                       | diesel exhaust                                                            |  |  |  |
| Materna et al.,<br>1992                                       | 1987–1989                      | Wildland firefighters<br>(IH sampling during<br>active firefighting) in<br>Northern California | crystalline silica; acetaldehyde; formaldehyde; PAHs; benzene             |  |  |  |
| Froines et al.,<br>1987                                       | Not reported                   | Fire stations (IH sampling; N=10) in New York, Boston, and Los Angeles                         | diesel emissions                                                          |  |  |  |

Five studies were conducted in California:

- Three studies used data collected from the Firefighter Occupational Exposures (FOX) study (Park et al., 2015; Shen et al., 2015; Shen et al., 2012) which measured polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and organochlorine pesticides (OCPs)
- One study conducted industrial hygiene sampling (crystalline silica, acetaldehyde, formaldehyde, PAHs, and benzene) among firefighters working at northern California wildland fires between 1987 and 1989 (Materna et al., 1992)
- One study measured total particulates as diesel emissions at three fire stations, one of which was in southern California (Los Angeles; discussed below) (Froines et al., 1987).

The FOX study (Shen et al., 2015, 2012) collected surface dust samples from fire stations in California between 2010 and 2011, and the authors reported the level of PAHs in fire stations as being higher than those found in California homes, and the level of PCBs as similar to California homes. In addition to surface dust samples, the FOX study also measured levels of PCBs and OCPs in firefighter serum; the study authors reported that firefighting is not a significant source of exposure to PCBs and OCPs (Park et al., 2015).

The firefighter industrial hygiene samples collected during wildland firefighting demonstrated potential for low-level exposures to carcinogens such as crystalline silica, acetaldehyde, formaldehyde, PAHs, and benzene (Materna et al., 1992).

Four studies investigated diesel emissions in fire stations:

- Froines et al. reported that fire vehicles were the major contributor of total particulates from diesel emissions after measuring exposures in ten fire stations in New York, Boston, and Los Angeles (1987). Further, firefighter exposure to total particulates increased with the number of runs conducted during an 8-hour period.
- Echt et al. found that the highest levels of elemental carbon (as a proxy for diesel exhaust) were measured in the fire station vehicle bays (maximum area sample measured up to  $683 \mu g/m^3$  of elemental carbon), which can travel to other areas of the fire station, such as the living quarters (1995).
- Sparer et al. found levels of particulate matter (PM<sub>2.5</sub>; proxy for diesel exhaust) and PAHs in fire station truck bays to be higher than the outside measurements, although the authors acknowledged that tobacco smoke was a confounding factor on some days (2017).
- Chung et al. reported that the majority of respirable elemental carbon concentrations (proxy for diesel engine exhaust) came from the vehicle bays; higher concentrations were observed in the summer, potentially due to higher activity levels (2020).

Finally, Fent et al. (2015) measured off-gassing from firefighters' personal protective equipment (PPE) after being exposed to a controlled burn. The study results showed that the air concentrations of benzene, 1,4-dichlorobenzene, ethylbenzene, and styrene measured from the used PPE were higher than the measured background levels. Interestingly, brand new PPE had a higher measured off-gassing air concentration of 1,4-dichlorobenzene than that of the used PPE that had been exposed to a controlled burn.

The identified carcinogens in the exposure studies above are described in more detail below (Table 6). Each of the carcinogens is presented, along with the target cancer endpoint, and the carcinogen-identifying authoritative body (IARC, 2020; NTP, 2016; 29 CFR part 1910, Subpart Z [OSHA]). The evidence for chemical classification is based on a variety of animal and/or human studies and is not specific to observations among fire mechanics.

Table 6. Carcinogenic chemicals of potential concern (COPCs) identified in the literature review

| Carcinogen Identified in Exposure Studies | Target Cancer Endpoints<br>(IARC, 2020; NTP, 2016)                                                                                                                                                                                      | Identifying Authoritative<br>Body |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Polycyclic aromatic hydrocarbons          | (PAHs):                                                                                                                                                                                                                                 |                                   |
| Benzo[a]anthracene                        | Benign or malignant lung tumors (adenoma or adenocarcinoma); liver cancer (hepatocelluar carcinoma); tumors at the site of administration                                                                                               | NTP-R, IARC-2B                    |
| Benzo[a]pyrene                            | Lung tumors; forestomach and esophageal tumors, intestinal tumors, and mammary-gland tumors                                                                                                                                             | NTP-R, IARC-1                     |
| Benzo[b]fluoranthene                      | Skin tumors; lung cancer (carcinoma)                                                                                                                                                                                                    | NTP-R, IARC-2B                    |
| Benzo[k]fluoranthene                      | Lung cancer (squamous-cell carcinoma)                                                                                                                                                                                                   | NTP-R, IARC-2B                    |
| Chrysene                                  | Liver tumors                                                                                                                                                                                                                            | IARC-2B                           |
| Dibenzo[a,h]anthracene                    | Cancer of the lung (adenomatosis or alveologenic carcinoma) and mammary gland (carcinoma), benign or malignant tumors of the forestomach (squamous-cell papilloma or carcinoma), and tumors of the blood vessels (hemangioendothelioma) | NTP-R, IARC-2A                    |
| Indeno[1,2,3-c,d]pyrene                   | Benign and malignant skin tumors (papilloma and carcinoma); lung cancer (carcinoma)                                                                                                                                                     | NTP-R, IARC-2B                    |

| Carcinogen Identified in Exposure Studies                                                                               | Target Cancer Endpoints (IARC, 2020; NTP, 2016)                                                                                                                      | Identifying Authoritative<br>Body |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Polychlorinated biphenyls (PCBs)                                                                                        | :                                                                                                                                                                    |                                   |
| PCB-28; PCB-52; PCB-66; PCB-74; PCB-99; PCB-101; PCB-138; PCB-153; PCB-170; PCB-180; PCB-183; PCB-187; PCB-194; PCB-203 | Hepatocellular adenoma or carcinoma                                                                                                                                  | NTP-R, IARC-1                     |
| PCB-105; PCB-118; PCB-156                                                                                               | Malignant melanoma, non-<br>Hodgkin's lymphoma, breast cancer                                                                                                        | IARC-1                            |
| Diesel exhaust:                                                                                                         |                                                                                                                                                                      |                                   |
| Diesel exhaust (measured as particulate matter or elemental carbon)                                                     | Cancer of the lung; cancer of the urinary bladder                                                                                                                    | NTP-R, IARC-1                     |
| Benzene:                                                                                                                |                                                                                                                                                                      |                                   |
| Benzene                                                                                                                 | Myeloid leukemia/ acute nonlymphocytic leukemia                                                                                                                      | NTP-K, IARC-1, OSHA<br>1910.1028  |
| Organochlorine pesticides (OCPs)                                                                                        | :                                                                                                                                                                    |                                   |
| 4,4'-DDT (dichlorodiphenyltrichloroethane)                                                                              | Cancers of the liver and testis, and non-Hodgkin's lymphoma                                                                                                          | NTP-R, IARC-2A                    |
| Lindane, Hexachlorocyclohexane<br>(Technical Grade), and Other<br>Hexachlorocyclohexane Isomers<br>(e.g. β-BHC)         | Non-Hodgkin's lymphoma                                                                                                                                               | NTP-R, IARC-1                     |
| Hexachlorobenzene                                                                                                       | Liver-cell tumors, renal tubular<br>tumors; parathyroid adenomas,<br>adrenal phaeochromocytomas, liver<br>hemangioendotheliomas, thyroid<br>follicular-cell adenomas | NTP-R, IARC-2B                    |
| Chlordane: trans-nonachlor and oxychlordane                                                                             | Hepatocellular carcinomas                                                                                                                                            | IARC-2B                           |
| Crystalline silica:                                                                                                     |                                                                                                                                                                      |                                   |
| Crystalline silica                                                                                                      | Lung cancer                                                                                                                                                          | NTP-K, IARC-1, OSHA<br>1910.1053  |
| Aldehydes:                                                                                                              |                                                                                                                                                                      |                                   |
| Acetaldehyde                                                                                                            | Adenocarcinomas and squamous-<br>cell carcinomas of the nasal mucosa;<br>laryngeal carcinomas;<br>hemolymphoreticular cancer; islet-<br>cell adenoma; osteosarcoma   | NTP-R, IARC-2B                    |
| Formaldehyde                                                                                                            | Cancer of the nasopharynx and leukemia; sinonasal cancer; lymphohematopoietic cancer                                                                                 | NTP-K, IARC-1, OSHA<br>1910.1048  |

| Carcinogen Identified in Exposure Studies | Target Cancer Endpoints<br>(IARC, 2020; NTP, 2016)                  | Identifying Authoritative<br>Body |
|-------------------------------------------|---------------------------------------------------------------------|-----------------------------------|
| Volatile organic compounds (VOC           | S):                                                                 |                                   |
| 1,4-Dichlorobenzene                       | Liver tumors                                                        | NTP-R, IARC-2B                    |
| Ethylbenzene                              | Lung adenomas, liver adenomas, renal tubule adenomas and carcinomas | IARC-2B                           |
| Styrene                                   | Lymphohaematopoietic malignancies                                   | NTP-R, IARC-2A                    |

Abbreviations: NTP = National Toxicology Program; NTP-K = known to be human carcinogens; NTP-R = reasonably anticipated to be human carcinogens; IARC = International Agency for Research on Cancer; IARC-1 = carcinogenic to humans; IARC-2A = probably carcinogenic to humans; IARC-2B = possibly carcinogenic to humans; OSHA = Occupational Safety and Health Administration

#### 4.2 Objective 2: Epidemiologic Studies of Cancer Among Fire Mechanics

#### 4.2.1 Initial Literature Search

The initial literature search did not identify any studies reporting on cancer risk, or rates of prevalent or incident cancers among fire mechanics. It is possible that the lack of findings is due to publication bias (i.e., groups without elevated or statistically significant results are less likely to be reported); thus to further ensure that relevant data were not missed, we conducted supplemental searches for related occupations (firefighters and auto mechanics) and compiled information from other sources for firefighters to further search for information specific to fire mechanics.

#### 4.2.2 Supplemental Literature Search for Cancer Outcomes

The supplemental search for specific cancer types and occupational cohorts yielded over 1,500 references in PubMed and Embase (cancer cohorts query, Table 4); however, text mining in SWIFT-Review, as described in section 3.6, for related studies did not indicate that any studies included data for fire mechanics. While we acknowledge that there is still a small chance that this population has been mentioned in passing in a study with another focus, which would not be indexed in any searchable capacity, our supplemental searching and review of studies of related populations did not reveal any findings to support that relevant data had been missed with our original search strategy. In short, no studies quantifying cancer risk specifically among fire mechanics were identified even through the supplemental search strategy.

After conducting a meta-analysis of 42 studies of cancer in firefighters (19 cohorts, 11 case-control studies, and 14 "other" studies), the IARC Working Group reported that only testicular cancer, prostate cancer, and non-Hodgkin's lymphoma showed significant summary risk estimates (2010). The Working Group identified indirect measurements of exposure (e.g., duration of employment) as a limitation of existing studies (IARC, 2010). Based on their review, the overall evaluation of occupational exposure as a firefighter was

possibly carcinogenic to humans (2B), based on limited evidence in humans and inadequate evidence in experimental animals (IARC, 2010).

A systematic review of the literature of cancer risks associated with occupations in firefighting and motor vehicle maintenance and repair is necessary to thoroughly characterize the risk of cancer in these populations. Our preliminary review of the secondary literature for epidemiologic studies of automotive mechanics and cancer suggests occupational exposure may be associated with an increased risk for bladder cancer, and is likely not associated with lung cancer or leukemia (Muscat et al., 1995; Reulen et al., 2008).

Finally, our review of the Nordic cohort studies for general mechanics, automotive mechanics, and fire mechanics, showed statistically significant associations between mechanics<sup>6</sup> and several specific cancer types (e.g., bladder, cervix, colon, esophageal, etc.; Pukkala et al., 2009). However, it is worth noting that the definition of mechanics used in these studies was not specific to automotive mechanics and may include other occupations, and therefore the Pukkala et al. cancer types were not included in Table 7 (2009). Prior to that report, smaller Nordic studies of cohorts of automotive mechanics and bus garage workers showed elevated risks of non-Hodgkin's lymphoma, pancreatic cancer, urinary cancer outside the bladder (ureter and urethra), pleural mesothelioma, and lung cancer (Dryver et al., 2004; Hansen, 1989; Gustavsson et al., 1990). However, no results were found for fire mechanics in these studies, and the exposures and risks of all mechanics combined may not be generalizable to fire mechanics or automotive mechanics.

The various cancer sites and types reported in the primary literature for automotive mechanics and in the Nordic cohort studies specific to automotive mechanics are presented in Table 7. The cancer types associated with firefighters (as identified by the meta-analysis presented in IARC, 2010) are provided for additional context as to potential cancers that may have overlap with fire mechanics.

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<sup>&</sup>quot;Mechanics" was defined as "workers who make products of metal, and assemble and repair machines and motors" (Pukkala, et al., 2009).

Table 7. Reported cancer types potentially associated with occupation in firefighting and automotive maintenance and repair

| Cancer Site or Type    | Secondary<br>Literature,<br>Auto Mechanics | Nordic Cohorts,<br>Auto Mechanics | IARC, Firefighters |
|------------------------|--------------------------------------------|-----------------------------------|--------------------|
| Bladder                | X                                          |                                   |                    |
| Lung                   |                                            | X                                 |                    |
| Mesothelioma           |                                            | X                                 |                    |
| Non-Hodgkin's Lymphoma |                                            | X                                 | X                  |
| Pancreas               |                                            | X                                 |                    |
| Prostate               |                                            |                                   | X                  |
| Testicular             |                                            |                                   | X                  |
| Ureter and Urethra     |                                            | X                                 |                    |

#### 5 Discussion and Conclusions

This structured literature review illuminated the paucity of literature available for the characterization of potential carcinogenic exposures and cancer risks of fire mechanics. Occupation as a fire mechanic and risk of cancer has not been evaluated in the current scientific literature.

For the first objective of identifying studies reporting carcinogenic exposures experienced by fire mechanics, no occupational chemical exposure studies explicitly focused on fire mechanics, fire mechanic cleaners, or firefighting vehicle maintenance workers. However, nine industrial hygiene studies presented data for fire stations and firefighting vehicles and/or gear, which likely overlap with the occupational exposures of fire mechanics who repair and clean firefighting vehicles. The chemical carcinogens evaluated in these studies included benzene, diesel exhaust, PAHs, PCBs, OCPs, acetaldehyde, formaldehyde, crystalline silica, 1,4-dichlorobenzene, ethylbenzene, and styrene.

For the second objective of identifying studies of cancer risks or rates among fire mechanics, no epidemiologic studies were identified. A supplemental search was conducted to identify risk of cancer in the related occupations of firefighting and automotive maintenance and repair. Though a more thorough systematic review is necessary to fully characterize the risks in these occupations, our preliminary review of IARC monographs and the supplemental literature demonstrated that a number of cancers have been reported as increased in both firefighters and general or automotive mechanics. While the studies of firefighters and automotive mechanics provide additional insight into the risks associated with these related occupations, the results of these studies may not be generalizable to the experience of fire mechanics.

The findings from this literature are informative with respect to potential chemical exposures to be evaluated in the qualitative and quantitative exposure assessments that ToxStrategies will conduct (i.e., Tasks 2 and 4).

#### 6 Next Steps

During the initial site visits, ToxStrategies will conduct a qualitative exposure assessment (Task 2) to determine similar exposure groups (SEGs) among the workers and prioritize/define the scope of the quantitative exposure assessment based on a risk ranking that incorporates the relative magnitude of the exposure potential (AIHA, 2015). A walk-around survey of the selected fire stations will be conducted, and observations will be made of the potential sources of exposures to chemical carcinogens at each location, as well as the manner in which those exposure may occur to characterize the exposures to fire mechanics who repair and clean firefighting vehicles.

Based on the findings from the literature and facilities records review (Tasks 1 and 2), employee records will be evaluated for completeness and suitability for a future cancer epidemiologic study (Task 3). As identified in the proposed scope of work submitted by ToxStrategies, due to the study timeline and scope, it is not feasible to calculate cancer incidence in this study population of fire mechanics. Interviews with current and former fire mechanics will provide observational information of cancer cases, but this information is not sufficient to demonstrate associations with chemical exposure, nor a causal relationship with the jobs of fire mechanic or firefighting vehicle cleaner.

The scope of the quantitative assessment (Task 4) will be determined from the results of the qualitative assessment, but we anticipate that exposure monitoring of workers for airborne chemicals, as well as chemical analysis of surface residues, will be included. SEGs will be assigned, and a representative number from each group will be selected for personal breathing-zone (PBZ) air sampling and surface/dermal wipe sampling of equipment.

Task 5 will include calculating the theoretical excess cancer risk from exposure to carcinogenic materials for each SEG determined from Tasks 2 and 4 and toxicity criteria relevant for California risk assessments. The risk assessment will result in an estimate of the probability of developing cancer as a result of exposure, expressed in terms of the numbers of people out of one million. Varying degrees of conservatism will be added to this approach to ensure that cancer risk is not underestimated, which makes it probable that potential risk will be overestimated.

Task 6 may include analyzing public comments, explaining the rationale for specific policy recommendations, and disseminating the study findings to the Governor, Legislature, Occupational Safety and Health Standards Board, Los Angeles County Board of Supervisors, and stakeholders in the workers' compensation system.

#### 7 References

AIHA (American Industrial Hygiene Association). 2015. A Strategy for Assessing and Managing Occupational Exposures. 4<sup>th</sup> Edition. American Industrial Hygiene Association, Falls Church, Virginia.

Chung J, Demers PA, Kalenge S, Kirkham TL. 2020. Career fire hall exposures to diesel engine exhaust in Ontario, Canada. J Occup Environ Hyg 17(1):38–46, doi:10.1080/15459624.2019.1691729.

Dryver E, Brandt L, Kauppinen T, Olsson H. 2004. Occupational exposures and non-Hodgkin's lymphoma in Southern Sweden. Int J Occup Environ Health 10(1):13–21, doi:10.1179/oeh.2004.10.1.13

Echt A, Sheehy J, Blade L. 1995. Case studies: Exposure to diesel exhaust emissions at three fire stations: Evaluation and recommended controls. Appl Occup Environ Hyg 10(5):431–438.

Fent KW, Evans DE, Booher D, Pleil JD, Stiegel MA, Horn GP, Dalton J. 2015. Volatile organic compounds off-gassing from firefighters' personal protective equipment ensembles after use. J Occup Environ Hyg 12(6):404–414, doi:10.1080/15459624.2015.1025135.

Froines JR, Hinds WC, Duffy RM, Lafuente EJ, Liu WC. 1987. Exposure of firefighters to diesel emissions in fire stations. Am Ind Hyg Assoc J 48(3):202–207, doi:10.1080/15298668791384634.

Gustavsson P, Plato N, Lidström EB, Hogstedt C. 1990. Lung cancer and exposure to diesel exhaust among bus garage workers. Scand J Work Environ Health 16(5):348–354, doi:10.5271/sjweh.1780.

Hansen ES. 1989. Mortality of auto mechanics. A ten-year follow-up. Scand J Work Environ Health 15(1):43-46, doi:10.5271/sjweh.1883.

IARC (International Agency for Research on Cancer). 2010. IARC Monographs on the evaluation of carcinogenic risks to humans, Volume 98, Painting, firefighting, and shiftwork. Occupational Cancer Research Centre,

https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/.

IARC (International Agency for Research on Cancer). 2020. IARC Monographs on the identification of carcinogenic hazards to humans, agents classified by the IARC Monographs, Volumes 1–127. Updated on June 26. <a href="https://monographs.iarc.fr/agents-classified-by-the-iarc/">https://monographs.iarc.fr/agents-classified-by-the-iarc/</a>.

LeMasters GK, Genaidy AM, Succop P, Deddens J, Sobeih T, Barriera-Viruet H, Dunning K, Lockey J. 2006. Cancer risk among firefighters: A review and meta-analysis of 32 studies. JOEM 48(11):1189–1202.

Materna BL, Jones JR, Sutton PM, Rothman N, Harrison RJ. 1992. Occupational exposures in California wildland fire fighting. Am Ind Hyg Assoc J 53(1):69–76, doi:10.1080/15298669291359311.

Moher D, Liberati A, Tetzlaff J, Altman DG, The PG. 2009. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLOS Medicine 6(7):e1000097, doi:10.1371/journal.pmed.1000097.

Muscat JE, Wynder EL. 1995. Diesel engine exhaust and lung cancer: an unproven association. Environ Health Perspect 103(9):812-818, doi: 10.1289/ehp.95103812.

NTP (National Toxicology Program). 2016. Report on Carcinogens, Fourteenth Edition. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. <a href="https://ntp.niehs.nih.gov/go/roc14">https://ntp.niehs.nih.gov/go/roc14</a>.

Park JS, Voss RW, McNeel S, Wu N, Guo T, Wang Y, et al. 2015. High exposure of California firefighters to polybrominated diphenyl ethers. Environ Sci Technol 49(5):2948–2958, doi:10.1021/es5055918.

Pukkala E, Martinsen JI, Lynge E, Gunnarsdottir HK, Sparen P, Tryggvadottir L. 2009. Occupation and cancer — Follow-up of 15 million people in five Nordic countries. Acta Oncol 48(5):646–790, doi:10.1080/02841860902913546.

Reulen RC, Kellen E, Buntinx F, Brinkman M, Zeegers MP. 2008. A meta-analysis on the association between bladder cancer and occupation. Scand J Urol Nephrol Suppl 218:64–78, doi:10.1080/03008880802325192.

Shen B, Whitehead TP, McNeel S, Brown FR, Das R, Israel L, et al. 2012. Measurements of PAHs, PBDEs, and PCBs in dust from California firehouses. Organohalogen Compounds 74:899–902.

Shen B, Whitehead TP, McNeel S, Brown FR, Dhaliwal J, Das R, et al. 2015. High levels of polybrominated diphenyl ethers in vacuum cleaner dust from California fire stations. Environ Sci Technol 49(8):4988–4994.

Sparer EH, Prendergast DP, Apell JN, Bartzak MR, Wagner GR, Adamkiewicz G, et al. 2017. Assessment of ambient exposures firefighters encounter while at the fire station: An exploratory study. J Occup Environ Med 59(10):1017–1023, doi:10.1097/JOM.00000000001114.

ToxStrategies, Inc. 2020. Proposal in response to RFP #4479, Assessment of Risk of Carcinogens Exposure and Incidents of Occupational Cancer among Mechanics and Cleaners of Firefighting Vehicles Volume 1 – Proposal. February 13.

Tsai RJ, Luckhaupt SE, Schumacher P, Cress RD, Deapen DM and Calvert GM. 2015. Risk of cancer among firefighters in California, 1988-2007. Am J Ind Med 58(7):715–729, doi:10.1002/ajim.22466.

#### **ATTACHMENT 1**

### Literature Search Protocol

## Attachment 1 Literature Search Protocol

**JULY 7, 2020** 

### ToxStrategies

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#### 1 Background and Rationale

Cancer risks from occupational exposures associated with firefighting have been assessed and described in the literature (IARC, 2010), and firefighters are included in the California Cancer Presumption for worker compensation purposes (Labor Code §3212.1). In comparison, for firefighting equipment mechanics and cleaners, there is limited information on potential occupational exposures and cancers observed.

The purpose of Task 1 is to identify and review relevant published literature to understand the state of the science with respect to exposure to chemical carcinogens associated with repairing and cleaning firefighting vehicles and equipment, as well as studies of cancer risk among fire mechanics.

#### 2 Objectives

The objectives of this literature review are as follows:

- 1. Identify carcinogenic chemicals of potential concern (COPCs) for mechanics who repair and clean firefighting vehicles and equipment
- 2. Identify epidemiologic studies evaluating the risk of cancer among mechanics who repair and clean firefighting vehicles and equipment.

The structured literature review results will be used to guide the activities of the latter tasks.

#### 3 Methods for Data Collection

Standard guidelines to conduct structured literature reviews, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, will be followed in the conduct of this review (Moher et al., 2009). These guidelines are widely accepted as the standard for conducting and reporting systematic literature reviews (SLRs). More than 170 journals in the health sciences endorse and require PRISMA for the reporting of SLRs and meta-analyses.

#### 3.1 Study Eligibility

Articles published through the date of the search with no lower date limit will be included in the review. Studies published in English as either peer-reviewed journal articles or conference abstracts will be eligible.

The following additional inclusion criteria will be employed to determine study eligibility for Objective 1:

- Population: Mechanics who repair and clean firefighting vehicles
- Exposure: Occupational exposures to potential chemical carcinogens
- Comparator: General population, non-exposed worker populations (e.g., office workers within firefighting discipline), workers with lower exposures
- Outcome: Any exposure measure or medical outcome
- Study Design: Industrial hygiene studies, exposure studies

The exclusion criteria to determine study eligibility are as follows:

- Population: No exclusions
- Exposure: Non-occupational exposures to chemical carcinogens; occupational exposure to non-carcinogens
- Comparator: No exclusions
- Outcome: No exclusions
- Study Design: Opinion pieces, reviews.

The following additional inclusion criteria will be employed to determine study eligibility for Objective 2:

- Population: Mechanics who repair and clean firefighting vehicles
- Exposure: Occupational exposures to potential chemical carcinogens
- Comparator: General population, non-exposed worker populations (e.g., office workers within firefighting discipline), workers with lower exposures
- Outcome: Cancer (any)
- Study Design: Cohort, case-control, case studies or case series

The exclusion criteria to determine study eligibility are as follows:

- Population: No exclusions
- Exposure: Non-occupational exposures to chemical carcinogens
- Comparator: No control group
- Outcome: Non-cancer outcomes
- Study Design: Opinion pieces, reviews.

The bibliographies of relevant reviews and publications will be hand-searched for additional citations of interest. If more than one article from the same study population was published, data from the publication with the longest follow-up or most specifically relevant population and/or outcomes will be extracted. For studies with overlapping data, those

with the larger population size or specifically relevant population and/or outcomes will be considered.

#### 3.2 Literature Searches

Databases to be searched include PubMed and Embase. The search strategy will be adapted to meet the search specifications of each included database. The search strategy includes search terms, language specifications, and other suitable filters for each database searched, and is designed such that outcomes of interest and possible stratification variables will be captured in the scope of the literature review. These will be translated into indexed Medical Subject Headings (MeSHs) and plain-language text-word terms using the National Library of Medicine MeSH thesaurus. The selected terms will be compared to index terms of related published studies to ensure that there are no gaps in the chosen search language. Boolean operators will be used to combine the final list of search terms into a comprehensive search strategy. As a final step, limit terms/filters will be added to the search strategy (e.g., English language) to ensure that only the most relevant studies are included in the final search yield. A draft search strategy is included as Section 3.3.

#### 3.3 Search Strategy

Due to the extremely limited number of studies identified in a scoping search, the final search strategy will employ a two-pronged approach:

**Step 1.** Conduct a primary literature search in PubMed and Embase to identify studies on exposures in fire stations, as well as general firefighting exposures that have been linked with cancer outcomes, in order to identify potential chemicals of concern for vehicle mechanics, using the search syntax shown in Table A.

Table A. Search Syntax for Step 1.

| Database | Search Syntax                                                                                                                                                                                                                                                                                                                                                                             |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PubMed   | ("fire station" or "fire department" or "fire fighter*" or firefighter*)  AND ("truck bay" or garage or maintenance or mechanic or helicopter or vehicle or "fire truck" OR "occupational exposure")  AND (exposure OR cancer[MeSH Terms] OR cancer OR carcinogen[MeSH Terms] or carcinogen*)                                                                                             |
|          | Pilot search on 6/25 yielded 203 results.                                                                                                                                                                                                                                                                                                                                                 |
| Embase   | ('fire station' OR 'fire department' OR 'fire fighter*' OR firefighter*)  AND ('truck bay' OR 'garage'/exp OR garage OR 'maintenance'/exp  OR maintenance OR 'mechanic'/exp OR mechanic OR 'vehicle'/exp  OR helicopter OR vehicle OR 'fire truck' OR 'occupational  exposure'/exp OR 'occupational exposure') AND ('exposure'/exp OR  exposure OR 'cancer'/exp OR cancer OR carcinogen*) |
|          | Pilot search on 6/25 yielded 148 results (138 potential duplicates from Medline)                                                                                                                                                                                                                                                                                                          |

**Step 2.** Conduct a primary literature search in PubMed and Embase for epidemiological studies of specific cancers identified in Step 1, evaluating all occupations, which may include mechanics or other trades that could work on vehicles and/or in fire stations.

Typically, three types of epidemiologic studies are of interest for occupational cancer reviews:

- 1. Cohorts of specific occupations that evaluate the incidence of all cancers
- 2. Case-control studies of specific cancers that evaluate all occupations
- 3. Large-scale studies that evaluate all occupations and all cancers.

Standard search strings (as we have specified in Step 1 above) will pull relevant studies in the type 1 category. However, it is important to note that not all studies in the type 2 category would be identified from the search if the cancer outcome results for firefighting mechanics are not significantly elevated and are reported only in the tables of the published literature. Hence, for this project, we will include the additional strategy of identifying specific cancers of interest and subsequently searching for studies that evaluate the risk of these cancers by occupation (type 2 studies). Finally, we plan to evaluate the epidemiologic literature from reports by IARC, NIOSH, and other agencies, as well as large-scale occupational cohort studies from Nordic countries (type 3 studies). Search syntax for Step 2 are shown in Table B (pilot searching was not performed for these searches).

Table B. Search Syntax for Step 2.

| Query          | Search Syntax                                                                                              |
|----------------|------------------------------------------------------------------------------------------------------------|
| Cancer cohorts | (lymphoma OR prostate OR testicular) AND cancer AND "occupational exposure" AND (cohort or "case-control") |
| Nordic cohorts | (Nordic OR Scandinavian) AND cohort AND occupation AND cancer                                              |

#### 3.4 Study Selection

Study selection will be documented through DistillerSR, a specialized software program designed for tracking and managing literature reviews, resulting in a fully auditable and transparent review process. A PRISMA flow diagram will be included in the study report detailing the flow of study inclusion and exclusion at each study level, including reasons for exclusion at the level of full-text review.

Review of studies will begin at the level of title and abstract. Reviewers will screen the titles and abstracts of the studies produced by the literature searches (after de-duplication) to determine their relevance for this review. Studies will be screened against the inclusion and exclusion criteria for study population, interventions, outcomes, and study design for each objective.

Articles designated as relevant from the title and abstract review will proceed to full-text review, where researchers will evaluate the full text of the article for relevance. Studies will again be screened against the inclusion and exclusion criteria, excluding case reports, case series with <20 patients, opinion pieces, studies published in languages other than English, and reviews. Relevant reviews will be identified during the full-text review, and the bibliographies will be hand-searched for additional citations of interest. Each study will be evaluated at the level of full-text review, by two reviewers independently, to determine agreement on included articles (100% QC). All disputes will be resolved by consensus adjudication. The results will be recorded, maintained, and assessed using DistillerSR.

#### 3.5 Data Abstraction for Step 1 Search.

Data will be abstracted in DistillerSR for all studies from Step 1 (as described in Section 3.3) deemed relevant to the review in the full-text review stage. The abstraction form will be reviewed prior to any data abstraction to ensure that all appropriate fields are captured, and an initial small sample of articles will be extracted to determine whether the form captures the appropriate information from the articles.

Anticipated data abstraction elements are as follows:

- General information, including title, authors, and year of publication
- Study characteristics:

- By person (demographics, job, confounders)
- By place (geography, workplace/facility)
- By time (calendar years of conducted study and follow-up)

#### Outcomes

- Objective 1: Occupational exposures (chemical, exposure levels)
- Objective 2: Cancer-related outcomes (numbers, incidence rate, mortality rate, odds ratios, risk ratios, hazard ratios, standardized incidence ratios, standardized mortality ratios).

#### 3.6 Study Selection and Data Abstraction for Step 2 Search.

Studies identified during our supplemental searches (as described in Section 3.3, Step 2) will be reviewed for relevance at the title and abstract level; relevant full-text studies will be searched for data for fire mechanics. Due to the volume of studies anticipated for the cancer cohorts search, we will use the Sciome Workbench for Interactive computer-Facilitated Text-mining (SWIFT-Review) interactive text-mining tool to scan titles, abstracts, keywords, MeSH annotations, and SWIFT-generated tags for the following syntax: "occupational AND cohort AND cancer AND occupations," "fire AND (maintenance OR cleaning OR mechanic)," and "mechanic AND cohort."

Studies from the supplemental search that appear relevant but do not meet the objectives inclusion criteria will be summarized and cited within the report but not included in the data abstraction table.

#### 3.7 Data Synthesis

A narrative summary of the review, including the methods and results for each outcome identified in the literature review, will be developed.

Possible elements include:

- Identification of COPCs
- Work tasks associated with exposures to COPCs
- Characterization of important confounding factors and biases
- Significant cancer outcomes associated with occupational exposures among this worker population
- Strengths and limitations of studies.

#### 3.8 Limitations of Review

This review will be limited to peer-reviewed journal articles and conference abstracts published in English. Information published in the grey literature will be excluded. The results

of this review may be generalizable only to the geographic areas and populations included in the studies.

#### 3.9 Dissemination of Results

The results of this review will be submitted to the State of California Department of Industrial Relations under Assembly Bill No. 1400. Specifically, the deliverables will include:

- EndNote library of the relevant publications
- Data abstraction file of included studies
- Written summary of the state of science.

The summary will include a list of COPCs and descriptions of work tasks that may result in exposure to the substance(s), with citations to specific publications. Cancers reported in this worker population will be also described. The results may also be submitted as a conference abstract to a relevant conference.

#### 4 References

International Agency for Research on Cancer (IARC). 2010. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 98, Painting, Firefighting, and Shiftwork. Occupational Cancer Research Centre,

https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/

Moher D, Liberati A, Tetzlaff J, Altman DG, The PG. 2009. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLOS Medicine 6(7):e1000097, doi:10.1371/journal.pmed.1000097.

#### **ATTACHMENT 2**

### **Data Abstraction File**

| Literature Search Data Abstraction Table | bstraction Table                                                                                 |      |                                                  | General study information                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Author                                   | Title                                                                                            | Year | Geographic<br>location of<br>study:              | Author's objective                                                                                                                                                                                                                                                                                   | Author's conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | sugisep Apms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Data collection methods used:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Chung, J., Denners, P. T. L. T. L.       | Career fire hall exposures to diesel 2020<br>engine exhaust in Ontano.<br>Canada                 | 2020 | Ontario.<br>Canada                               | The study to blective was to evaluate diesel engine exhaust (DEE) levels in career fre hals in Ontario, Canada.                                                                                                                                                                                      | The study objective was to evaluate clese  The study objective was to evaluate clese  The results show that fired study continues and the study oppulation consisted of 12 and a season of applicant (LEV) units  Although no cocupational exposure limit for DEE and a Time falls were selected if and continue to implement DEE control isrategies to character the half was the fire that responded to the reduce exposures to mitgate potential health risks. Inferent building design that had a moderate to high call volume. | The study oppulation consisted of 12 carear fine hals from six different clies (City,-City,) within the province of Ontano. Canada. Two fine hals were selected in each participating off through consultations with participating fire opparitients. The first hall selected in each opportunitients with participating fire opparations with participating fire opparations with participating fire participating fire participating fire first hall selected in each right selected was a hall with a fire separate for identifying the number of mines for expensive selected was a hall with a different building design that had a moderate to high call volume. | Respirable elemental extra rotino (REC) was neasured using a modified MIOS4 analytical method (e.g., method 5040) for diesel plantical method. The MIOS4 analytical method of the MIOS4 an |
| Echt. A. Sheelty,<br>J., Blade, L.       | Exposure to diesel exhaust manasions at three fire stations: Evaluation and recommended controls | 1995 | Not specified;<br>authors are<br>located in Ohio | Not specified: The National Institute for Occupational Safety Juthors are and Heatht (NIOSH) conducted a health hazard evaluation (HFE) at three engine houses of a municipal fine department to evaluate exposure to diese levaluaties exposure to diese expartment emissions in the engine houses. | When diesek-powered equipment leaves or returns from a neighe house, exhaust ensisons containing diesel particulate are produced inside the agreatuse bay, the felsel exhaust can then enter the living quarters. The agreement of current toxicological and epidemiological evidence suggests that occupational exposure to diesel exhaust is a potential cardinogen.                                                                                                                                                              | Personal breathing zone and general area al samples for elemental carbon were collected at all three engine houses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | At each engine house, samples were collected in the breathing zones of an officer and two other enjoyees (either fire fighters, medicine fighters, medicine fighters, medicine fighters, medicis, or medic traines). To evaluate the exposures that occurred the the enjoy and exclude those that occurred while right the mengen to when their wehicle cleaned the engine house doors and turn the pumps on when the wehicle began backing into the engine house upon their return. Area samplies were also collected at each engine house.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Literature Search Data Abstraction Table            | bstraction Table                                                                                 |       | a.                                               | Potential carcinogens identified in studies                                                    | d in studies                                                                             |                                                                                                                                              |                         |                                                                   | Exposure details and relevant notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------|-------|--------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Author                                              | Title                                                                                            | Year  | Geographic<br>location of W<br>study: a          | What potential carcinogens are reported? > Diesel are reported? > Diesel are reported? > Desel | )<br>lens a                                                                              | What potential carcinogens   What potential caraire reported? >> Polycyclic are reported? >> aromatic Hydrocarbons   Polychlorinated   PAHs) | arcinogens<br>biphenyls | What potential carcinogens<br>are reported? -> Other<br>(specify) | What exposure information is reported?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Chung, J. Demers, P. A. Kalenge, S., Kirkham, T. L. | Caneer fire hall exposures to diesel 2020 engine exhaust in Ontario.                             |       |                                                  |                                                                                                | Respirable elemental carbon (REC) as a surrogate for diesel engine exhaust (DEE)         |                                                                                                                                              |                         |                                                                   | Of the 69 samples collected : 16% had detectable elemental carbon concentrations, where all but one was taken within the vehicle bay diesgo6.5 mg/lin-2.7 mg/lin-3. The data inclicates vehicle bay texposures may be higher in hals with LEV units, those that respond to none emergencies, have a backen vehicle bay design compared to driventhough design, and during the summer season. Three samples (4.3%) socaeded the cocapational exposure limit however, the estimated exceedence reaction of the underlying whiche bay exposure distribution was 17%. Eight mals had LEV units, where performance ranged from 3.6% to 85.3% (median= 54%) when compared to manufactuer recommendations. |
| Eroh, A., Sheehy,<br>J., Blade, L.                  | Exposure to diesel exhaust emissions at three fire stations: Evaluation and recommended controls | 26661 | Not specified;<br>authors are<br>located in Ohio | ய க் © ©                                                                                       | Elemental carbon (used as a surrogate measure of assurrogate particulate diesel exhaust) |                                                                                                                                              |                         |                                                                   | The highest levels of elemental carbon, ranging from 86 ug/m² (Engine House 2) vere measured in the apparatus bays of the three fire stations on Day 1 (general area samples).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Literature Search Data Abstraction Table                                                          | bstraction Table                                                                                                    |                     |                                                             | General study information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| Author Fent, K. W., Evans, D. E., Booher, D., Pleil, J. D., Stiegel, M.A., Hom, G. P., Dalton, J. | Title  Volatile organic compounds off- gassing from firefighters' personal profective equipment ensembles after use | <b>Year</b><br>2015 | Geographic<br>location of<br>study:<br>Chicago,<br>Illinois | Author's objective The author's conclusion The study were to The overhaul and off-gas air concentrations w The study were to The concentration and composition of well below applicable short-term occupational Valettle organic compounds (VOCs) off — Exposure Imitis. Compounds to pre-but heve, The concentration of the concentration | Author's conclusion The overhall and off-gas air concentrations were well below applicable short-term occupational was below applicable short-term occupational authors measured ~2 fold increases in mean breath                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Study design: This experiment consisted of three controlled structure burns that took place inside an intermodal metal container with two rooms made of drivwall. New drywall                                                                                                                                                                                                                                   | Data collection methods used: Sampling VOCs off-gressing from PPE Ensembles: Approximately 25 minutes after completing overhaul for each controlled burn, the two nesembles (except for SGBA) were placed inside the clean nericosures along with evacuated canisters to collect off-gas samples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                   |                                                                                                                     |                     |                                                             | ions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | and contentiations of betrazen, cludine, and styrene after the burns. Air concentrations of benzene, toluene, ethylbenzene, xylenes, and styrene toluene, ethylbenzene, xylenes, and styrene toluene (TSY) measured off-gassing from finelighters used EPE and in firelighters position exhaled breath were significantly corrielated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | was erected for each burn. The sampling performed included: all sampling inside the structure, off-gas sampling, and exhaled breath sampling. The main purpose of the sampling was to determine the magnitude and composition of VOCAs that were generated during the fires, subsequently def-gassed from the firefless ensembles, and systemically absorbed by the fireflighters and exhaled in their breath.  | over 15 minutes to perform comparison with stork-term occupational approars in minutes to perform comparison to a special minus (OELs). Using the same method, they also did tousens as the control.  VOCs were sampled of spassing of brand-new fumout coats and trousens do the sampled brands are the structure (during semi-votatile PAHs, were sampled in skinled compounds, including semi-votatile PAHs, were sampled in skinled breath approximately 4-14 minutes after completion of overhaul for each burn (2-10 minutes after finelighters doffed their PPE).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Fronse, J. R. Hinds, W. C. Duffy, R. M. Laftente, E. J. Lu, W. C. Y.                              | Exposure of frefighters to diesel emissions in fre stations                                                         | 1987                | New York. Boston, and Los Angeles                           | Af the request of the International Association of Fire Fighters and the Los Angeles, Boston and New York free departments, the authors conducted a study of freelighter exposure to diesel particulatios in free stations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | For the tan fire stations sampled, the major contributor to the measured leves of fotal particulates was the diese temssors from the fire particulates was the diese temssors from the fire some sets of the stationary of the stati | Personal sampling of frieighters was used for measure exposure to troll airborne particulates in the ten fire stations. Representables samples were collected at fife trucks and skife free places, five fifer trucks and skife replaces. A real-line aerosol monitor (RAM-1, GCA Corp.) was airborne particulates on the vehicle froor airborned truck and engine at drivers entry of a New York fire station. | Personal sampling was used to measure exposure to total airborne particulates in the fire stations: Dp Pont P 2500 purps; Qu Pont Company) were used at a flow vitae of 2 Limin. Telbroi-coated glass filed filters were used at a flow vitae of 2 Limin. Telbroi-coated glass flow filters were used to determine the methylene chloride soluble farcation of the total particulates. Pumps were calibrated before and fafter each 8-th sampling period.  There was a study team member in each fire station to observe pumps' performance continually. Stations in New York and Boston were sampled for district the predict. One New York station was sampled to 164 hr. About five fireflighters were sampled during each 8-th period. For station and period of the arrowed their pumps before leaving the fire station to respond to an alaim. Pumps were laken to an office that was located away from the fire station equipment floor and continued to operate in this area. Upon return to the station, each fireflighter stands wering this pump again. In the station, each fireflighter stands wering this pump again, an owned operating conflicions, the authors also estimated the most severe exposure to deset particulates that a fireflighter might retrounter during an 8-th reflord in a Los Angeles file station. It was clearly on each of a lower to the station with all the truck and engine were turned on and allowed to idle for fire station. It was determined that the wind over and doors in the fire station during this simulated exposure. Personal sampling of nine fireflighters was conducted over the 8-tr stiff to assess individual exposures. |

| Literature Search Data Abstraction Table                                               | sbstraction Table                                                                 |           |                                                        | Potential carcinogens identified in studies                      | d in studies                                                                                                                                          |                                                                                       |                                                                                                                       |                                                                                                             | Exposure details and relevant notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------|--------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Author Fent K W. Evans D E. Booher D. Peli, J. D., Slegel M A., Hom, G. P., Dalton, J. | Title gassing from frefighters' personal protective equipment ensembles after use | Year 2015 | Geographic location of study: Study: Chicago, Illinois | What potential carcinogens an are reported? > Benzene es Benzene | What potential carcinogens are reported? > Diesel                                                                                                     | What potential carcinogens The reported? > Polycyclic of aromatic Hydrocarbons (PAHs) | What potential carcinogens are reported? > are reported? > potential diphenyls organophicine pesticides (OCPs) (OCPs) | What potential carcinogens are reported? > Other (Specify) VOCs. 1 4 dichlorobenzene, ethylbenzene, styrene | What exposure information is reported?  Ar Concentrations of VOCS off-gassing from PPE Ensembles. The air concentrations measured from used PPE ensembles were generally higher than the background levels, with statistically againfrient differences (P < 0.05) observed for accident 1.4-dichlorobenzene, and cyclohexane. Of note, the off-gassing air concentration of 1.4-dichlorobenzene was higher for the brand new turnout cost and trousers than the used PPE ensembles. All air concentrations were well below any applicable short term OELs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Froines, J. R., Hinds, W. C., Duffy, R. M., Laftbente, E. J., Llu, W. C. V.            | Exposure of freighters to desei emissions in fire stations                        | 1987      | New York.<br>Boston, and<br>Los Angeles                | - E                                                              | Total airbome particulate matter (the major contributor to the measured levels of total particulates was the diesel emissions from the free vehicles) |                                                                                       |                                                                                                                       |                                                                                                             | The data presented show that firefighters are exposed to increased levels of particularities rim diseal emissions. The levels of total attorne particularies ranged from particularies from diseal emissions. The levels of total attorne particularies angod from how you golm? to as high as 480 µg/m². Firefighter exposure to total particularies increased with the number of runs conducted during an 8-hr period. In New York and Boston where the response levels do from 10 of 10 µg/m² for diseal particularies where for the seal and period from 70 of 10 µg/m² (TWA). The important sources of particularies beyond those produced by the diseap-owered vehicles were cooking furmes, ambient aerosal and cigarelie smoke. Methylene chloride extracts of the diseal particulates surged 24% of the total.  Smoking controlling 12 burdeen percent of the firefighters sampled were smokers. Smoking controlling 10 burdeen percent of the firefighters sampled were smokers. Smoking controlling 10 burdeen percent of the firefighters sampled were smokers. Baccause of winter weather conditions, doors and windows of fire stations in New York and Boston were kept chose of the sampling genders except and because of the firefighters were effect open. The sample of the sampling genders were effect open. The sample are sampling equipment at the sound of an alarm as previously descentable, the sampling equipment at the sound of an alarm as previously descentable, the sampling equipment of dieseal exhaust underestimates the personal exposure concentration. During this pender for the vehicle or gathering equipment and the whole to operate away from the reliable or gathering equipment of the vehicle Descele burger of the vehicle or gathering equipment and not he vehicle. But the sample gate of highest concentration to the vehicle or pastering equipment and not he vehicle. |

| Literature Search Data Abstraction Table                                                                    | bstraction Table                                                         |      |                                     | General study information                                                                                                                                                                                                                                                                                                                                                                        | Ì                                                                                                                                                                                                                                                                                                                                                                                             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| Author                                                                                                      | Title                                                                    | Year | Geographic<br>Iocation of<br>study: | Author's objective                                                                                                                                                                                                                                                                                                                                                                               | Author's conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Study design:                                                                                                                                                                                                                                                                                                                                    | Data collection methods used:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| Matenna, B. L., Jones, J. R., Sutton, P. M., Rottman, N., Hamison, R. J.                                    | Occupational exposures in California wildland fre fighting               | 1992 | Northem<br>Califomia                | This paper describes industrial hygiene data from the 1987 through 1989 widdire seasons                                                                                                                                                                                                                                                                                                          | withing show that wildland fire lighters may at times be exposed to concentrations of carbon monoxide, total or respirable particulates, or silica at levels are or higher than recommended occupational exposure limits, although goup means were generally well below the limits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Industrial lygiene sampling was conducted at nothen California widland fines during three successive fire seasons (1987 to 1989).                                                                                                                                                                                                                | Results show that wildland fire fighters may at times. Industrial hygiene sampling was conducted. Constant-flow sampling pureps, seve used for all high-flow sampling to exposed to carbon monoxido. at northern California wildland fires during applications. Low-flow sampling was done with two types of flow-flow total or espirable particulares, or silica at levels. Intere successive fire seasons (1987 or sampling pumps, stude counters and constant flow models. Issue) as sampling pumps, stude counters and constant flow models. Issue in the successive fire seasons (1987 or sampling pumps, stude counters and constant flow models. Issue in the successive fire seasons (1987 or sampling pumps, stude counters and constant flow models. Issue in the successive fire seasons (1987) as sampling pumps, stude counters and constant flow models. Issue in the sample of the sample of the sample or sampling pumps, stude counters and constant flow models. Issue in the sample of the sample or sampling pumps, stude counters and constant flow models. It is sampling pumps, stude counters and constant flow models. It is sampling pumps, stude counters and constant flow models. It is sampling pumps, stude counters and constant flow models. It is sampling pumps, stude counters and constant flow models. It is sampling pumps, stude constant flow models. It is sampling pumps was a flow flow models. It is sampling pumps was a flow flow models. It is sampling pumps which models are supplied to the sample of the |
| Park, J. S. Voss, R. W. W. McNeel, S. Wu, N. Guo, T. Wang, Y. Strael, L. Das, R. Petraas, M. R. Petraas, M. | High exposure of California freighters to polybrominated diphenyl ethers | 2015 | Southern                            | The authors measured levels of persistent organic pointains (POPs, polybrommated dipheny) ethers (PDES), polybrommated dipheny) ethers (PDES), and organic polybromism persiddes (DCPs) in freighter serum samples collected during 2010-1. They compared these levels to those from other coupationally exposed groups (e-weste workers and foram ethory and organic pathways among freighters. | authors measured twise of pecisient. High levels of PBDEs were measured in frelighters organize authors measured the size of PBDEs were measured in frelighters organized by the populations in property in the property in the pecine of the populations in property in the pecine of the property in the pecine of the pecin of the pecine of th | A convenience sample of firelighters from a<br>Southern California county was invited to<br>the part in the Firelighter Occupational<br>Exposures (FOX) study. Blood and unite<br>samples were obtained for analysis of<br>PRDEs, PCSs, and CoSr. Medical records<br>and a self-administered exposure<br>assessment questionnaire were utilized. | ight kewis of PBDEs, were measured in ferlighters from a 101 ferlighters blood and unine were analyzed for PBDEs, PCBs. Solution county was invited to and OCPs. Data were abstracted from medical records for the calcium a charity with the fireflighter occurry was invited to and OCPs. Data were abstracted from medical records for the part in the fireflighter by the part in the fireflighters is an even and the fireflighters are were obtained for an analyse of the same part of record and the part in the fireflighters are were not interflighters are were not an experimental the fireflighters are were not an experimental to U.S. levels. Muthariable assessment questionnaire were utilized. Ocreaned assessment and self-administrated exposition for the part of t |

| Literature Search Data Abstraction Table                                                                     | bstraction Table                                           |      |                                       | Potential carcinogens identified in studies | ed in studies                                                    |                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                         |                                                             | Exposure details and relevant notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| Author                                                                                                       | Title                                                      | Year | Geographic<br>location of V<br>study: | What potential carcinogens a                | What potential carcinogens a are reported? > Diesel a exhaust (F | What potential carcinogens   What potential ca<br>are reported? >> Polycyclic are reported? >><br>aromatic Hydrocarbons   polychlorinated  <br>(PCBs) | arcinogens<br>biphenyls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | What potential carcinogens are reported? > voganochlorine pesticides a (OCPs)                                                                                                                                                                           | What potential carcinogens are reported? -> Other (specify) | Mat exposure information is reported?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Matema, B. L., Jones, J.<br>R., Sutton, P.<br>R., Zutton, P.<br>R. J.                                        | Occupational exposures in California wildland fre fighting | 1992 | æ eie                                 |                                             |                                                                  | irtons (PAHs);<br>irtons (PAHs);<br>jaintnacene,<br>jayorane,<br>jilyoranthene,<br>(ia.hjanthracene,<br>(ia.hjanthracene,                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                         | Costaldelyde: Formaldelyde: Crystalline silica              | Acataldehyde, Formaldehyde, Freiline sxposure montioning demonstrated that widdand fine fighters may at times be exposed to carbon monoxide, total and respirable particulates, or organiline silica at evaced to carbon monoxide, total and respirable backup means were always well below permissible limits.  Formaldehyde was the predominant aldehyde detected in fire smoke, both at flaming and smoldening fires. Results of TWA sampling include that formaldehyde levels are likely to these excursions above 0.37 mg/m² (0.3 ppm), which may result in eye or respiratory mitation.  Polycyclic anomatic hydroactbons, some of them known to be carcinogenic, were of polycyclic anomatic hydroactbons, some of them known to be carcinogenic, were detected in fire smoke at very low levels. Similarly, limited benzene sampling generally indicated tow or nondetectable levels; however, one sample exceeded 0.1 ppm, which has recently been proposed as a new TLV because of benzene's carcinogenic potential.                                                                                                                                                                                                                                                                                                                                                                             |
| Park, L. S., Voss, R.<br>W., McHeel, S., Wu,<br>N. Guo, T., Weng,<br>Y., Israel, L., Das,<br>R., Petrass, M. | firefightes to polybrominated diphentyl ethers             | 2015 | Southem                               |                                             |                                                                  |                                                                                                                                                       | polychomate biphranate biphranate biphranate biphranate pesticides (PCBs; PCBs; PCBs | Organochiorine pesticides<br>(OCPs), B-BHC<br>(Hexachloroxyclohexane), 4,4''.<br>DDT, 4,4''.DDE,<br>DDT, 4,4''.DDE,<br>norabilor, oxycliodane<br>norabilor, oxycliodane<br>(Chlordane is the parent<br>compound of trans-nonachlor<br>and oxychlordane) |                                                             | Many PCB and OCP congenes conneited with each other but not with the major PBBEs, supporting the hypothesis that exposure pathways for PCBs and OCPs are different from those for PBDEs. This study suggests that freighting is not a significant source of exposure to PCBs and OCPs. PBDEs may be transported back to fine astations on equipment (hoses, laddens, and 805A) and clothing. Contact with solied turnout gear and exposure opportunity during other and storage at the fine station. This research shows very high PBDE levels in first station dust (e.g., media BDE-209 (right) 4.7 (100% 2.50 oin Callionia revisionist Lebs and OCPs, but not PBDEs, were lower among freighters whose variedinated broate dust), which suggests that when freighters exturn to the fire station, murdut gear was professionally decontaminated in the past year. Decreases (and patients) growing the PGB-180, could be considered many freighters whose transport freighters whose transport freighters whose transports of the past year. Decreases (and patients) growing the patient properties of the past year. Decreases (and patients) and the past year than expendent of the past year. Because of 30% with more freighters than dwesting furning urmout gear at the firehouse or storing it is an open room (versus a personal locker) had lower serum levels of BDE-28, 47, 59, and -100. |

| Literature Search Data Abstraction Table                                                                           | bstraction Table                                                                                     |      |                                        | General study information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Author<br>Shan, B.,Whitehead, T.<br>P., Medeel, S.,Brown, F.<br>R.,Das, R., Israel, L., Park,<br>J. S.,Petreas, M. | Trite Measurements of PAHs, PBDEs, and PCBs in dust from California firehouses                       | 2012 | Geographic location of study: Callonia | Author's objective Freelighters are exposed to a unique profile of potentially free-telated character, considered contaminants, including doxins, antimony, and other metals, as demonstrated by be-montloning studies. In this plot study, the authors measured concentrations of PAHS, PBDEs, and PCBs in dust form 20 calient in freely less of the possible that frefighters carry dust contaminated with PAHs and PBDEs into their contaminates on their books and protective clothing after extinguishing frees. | Author's conclusion Concentrations of PAHs and PBDEs are much Concentrations of PAHs and PBDEs are much higher in dust from California behouses than in house dust from California homes, suggesting that house dust from California homes, suggesting that sources. Concentrations of PBDEs in dust from California frehouses were orders of magnitude higher than concentrations of PAHs and PCBs in the same samples.                                                                                                                               | Study design: Dust samples were collected from the Evacuum cleaner bags used in the living quarters of 20 California frehouses in 2011 and in 2011.                                                                                                                                                                         | Data collection methods used: Breity, the samples were sleved to remove fibers and debris larger than 150 µm. The resulting fine data was allyqueffer (0.2 g) and spiked with a mixture of labeled internal standards (1 PAH, 8 PBDEs, 15 PDEs, and 2 pesiblicates) and extended by accelerated solvent inspectages and or self-stopphynass spectrometry (EFCAMS, Aglent Teachnologies), PBDEs and PDEs were analyzed tor PAHs using low-resolution electron impactages chromatographynass spectrometry (EFCAMS, Aglent Teachnologies), PBDEs and PDEs were analyzed using high resolution EI-CAMS (Thermefringan wMT95). The shorional institute of Standards and Technology Standard Reference Material (NIST SRM) No. 2585 was used in each run for additional quality control.                                                                                                                                                                                                                               |
| Shen, B.,Whitehead, T. P.,Mohele, S.,Bown, F. R., Chalwal, J., Das, R., Israel, L., Park, J. S., Petreas, M.       | High levels of polybrominated diphenyl ethers in vacuum cleaner dust from California fire stations   | 2015 | California                             | Concentrations of polybrominated dipheny effects (PBES), but you'golis annatic hydrocarbons (PARs), and polycypilic annatic hydrocarbons (PARs), and polycypilic annatic highlenys (PCBS) were measured in dust from 20 Cellifornii er sistations. The chemical concentrations in fire sistation at sistation dust were compared to concentrations previously reported in dust from residences and other occupational settings worldwide.                                                                              | BDE-209 concentrations in dust from California fine activations were among the highest of any previously documented formes or occupational settings in the world. Based on the findings of the pilot study, the world. Based on the findings of the pilot study, the surrors hypotheses that possible sources of BDE-209 in fire stations include confaminated ash and there deak thorn fine events via boots, clothing, and other equipment as well as specialized and other equipment treated with BDE-209, including tumout gear and fire vehicles. | In 2010-2011, dust samples from used from a vacuum cleanter bags, were collected from a 20 fire stations in California and analyzed is for polybrominated dipheraly eithers. Please, by collected by the collection of PABS, and polybriomated bipherals in PABS, using gas chromatography—mass is spectrometry.            | Dust samples were collected from vacuum deaners used in the living and administrative or quarkers of the fire stations; dust samples were saved to remove large debris and then underwent chemical analysis. Extracts were analyzed for 22 PBDEs and 16 PCBs using high-resolution; gas chromotography-mass spectrometry operated with electron impact onization mode. In addition, during dust collection, a two part on-site survey was conducted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Sparer E<br>H., Perdergast, D. Apell,<br>I., N. Bartzak, M.<br>R., Waberer, G.<br>J. E., Sorensen, G.              | Assessment of Ambient Assources Freighters Encounter while at the Fire Staton: An Explorationy Study | 2017 | Massachusetts                          | 1) to provide preliminary data on the air quality within a few the stations in and around Boston, Massachusettis; and, 2) to investigate some of the environmental and organizational factors that may influence the levels of contaminants in the air at the fire stations.                                                                                                                                                                                                                                           | Levels of PM <sub>2</sub> , and PAH inside fire stations may according to the stations may mornture to firelighter cancer static. Through undestanding contaminant variability, future studies can begin to design and test interventions that improve cancer prevention.                                                                                                                                                                                                                                                                              | At sampling of particulate matter less than 5.2 bm in diameter (Ph.) 2 and particle bound polycyclic aromatic hydrocarbons by CPAIs) was completed at four fire stations in Spring, 2016. There fire stations were located in Boston, Massachuserits, and one fire station was located in Admigron, just outside of Boston. | sampling included integrated and continuous measurements of particular entate (PM2), and continuous measurements of particles bound polycyclic annate bydractabons (PAH8) in three primary areas in and annual the station; the truck bay, the kitchen, and outside. Gawmente PMs, samples were collected using Tethon filters (47mm, Pail Life Sciences, Port Washington, NY, USA) used with an impactor cassette for measure PMs, samples were measured with a SidePak Aerosol Oomlinuous-readings of PMs, awere measured with a SidePak Aerosol Monitor Aktor (TSI, Minerapolis, MX).  2000CE (EcoChem Analytics, League City, TX) interviews: The purpose of the interviews was to understand the daily activities. The purpose of the interviews was to understand the daily activities of freighters, along with the policies and practices (both written and enabled) regarding engine ide-time, return and washing of contaminated clothing, and any other station-related health and safety activities. |

| Literature Search Data Abstraction Table                                                                                   | traction Table                                                                                                                        |      |                                     | Potential carcinogens identified in studies            | d in studies                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |                                                                              |                                                            | Exposure details and relevant notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                            | Title                                                                                                                                 | Year | Geographic<br>location of<br>study: | What potential carcinogens are reported? >> Benzene e: | What potential carcinogens are reported? > Diesel are exhaust | ens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | What potential carcinogens Ware reported? >> a polychlorinated biphenyls o (PCBs)          | What potential carcinogens are reported? >> organochlorine pesticides (OCPs) | What potential carcinogens are reported? → Other (specify) | What exposure information is reported?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Shen, B. Whitehead. T. M. P. McNeel, S. Brown, F. a. R. Das, R. Israel, L., Park, ff. J. S., Petreass, M.                  | Measurements of PAHs, PBDEs, and PCBs in dust from California frerhouses                                                              | 2012 | California                          |                                                        |                                                               | Polyocus aomatic hydrocarbons (PAHS): benzo[a]anthracene, benzo[a]anthracene, benzo[a]anthracene, benzo[b]fluoranthrace, benzo[a]anthracene, chrysene, dibenzo[a, h]anthracene, indeno[1,2,3-c,d]pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Docyclomated biphenyls<br>(PCSs) P CS-133, PCS-138,<br>and PCS-180                         |                                                                              |                                                            | california (CA) firehouses showed higher PAH concentrations as compared to CA America.  Marrica.  BDE-209 was the predominant PBDE congener measured in the California frehouses followed by BDE-98, BBC-47, BBE-101, BBE-153, BBC-208 and to a lesser extent, BBE-154, BBC-207, and BBE-209. The levels of BDE-209 measured in the California frehouses (maximum of 390 µg/g) are among the highest ever reported.  PCB concentrations in California frehouses were more consistent across congeners and ware dominated by 3 congeners. PCB-153, PCB-138, and PCB-180, PCB levels in California frehouses were comparable to PCB levels seen in Northern California residences.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Shen, B. Whitehead, T. H<br>P.,McNeel, S.,Brwn, F. di<br>R.,Dhalwal, J.,Das,<br>R.,Israel, L.,Park, J.<br>S.,Petreas, M.   | High levels of polybrominated diphenyl ethers in vacuum deaner dust from California fire stations                                     | 2015 | California                          |                                                        |                                                               | Polycyclic aomatic Hydrocarbons (PAHS): benzolg lanthracene. ordhysene. benzolg fillouranthene, benzolg fillouranthene, benzolg fillouranthene, denzolg fillouranthene, denzol | polychlormated biphenys<br>(PCBs) PCB-28, PCB-32,<br>PCB-101, PCB-105, PCB-118,<br>PCB-180 |                                                                              |                                                            | In general concentrations of PBDEs were higher than concentrations of PAHs and concentrations of PAHs were higher than concentrations of PAHs were higher than concentrations of PGBs in the fire stations, Each of three major PBDE congenes had median dust concentrations above 5000 ng/gl Gir Norgio for BDE-209 and 47000 high of PBDE-209. BDE-209 was the predominant PBDE congener measured in the dust from these fire stations. Median concentrations of PBDEs and PAHs in the fire station dust samples were substantially highratine and the same analytical protocols.  Correlations with the number of fire or hazardous meterial incidents, or fire station age, are presented in Table 2. The correlation substance chemicals and the number of vehicles in the fire station was not statistically significant.  Softwared positive relationships between PCB levels and fire station age are consistent with similar observations in California homes and suggest that the PCB-contaminated materials may still be present in fire stations built before the 1970s, when PCBs were                                                                                                                                                                                                                                                       |
| Sparer, E. H., Pendergast, D., Apell, E. J. N., Bartzak, M. W., Magner, G. R., Madamklewicz, G., Hart, J. E., Sorensen, G. | Assessment of Ambient Presidents Fredighters Encounter Exporators Fredighters Encounter while at the Fre Staton: An Exploratory Study | 2017 | Massachusetts                       | <u>u. v.</u>                                           | Particulate matter (PM) (proxy F<br>for diesel exhaust)       | Polycyclic aromatic<br>Hydrocarbons (PAHs); total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                            |                                                                              |                                                            | Mean and median daily evels of PAHs and PMs,s in the funct bay were higher than the outside measurements at each station and were evinitar across all station of measurements at each station and were evinitar across all station of the results of the PAH regression model (Table 3) indicated that average daily PAH elvels in the funct bay were higher when compared to outside, adjusting for station differences, and this association was statistically significant (g=2.2 66 ng/m², y-autue -0.0001). The average daily PMs,s levels (using the gravimetric data) in the truck bay were also on higher than outside, when adjusting for the other stations; and this association was statistically significant (g=10.74 µg/m², p-value = 0.028). The intervelses also indicated that practices surrounding washing of bunker gear varied from station to station. Oif-gassing from equipment post-fire might be another source of intention are of Station #4 and PMs,s observed in the truck bay of Station #4 and pwd, proper at Station #4 allowed for some freighters to sancke while at work. These freighters had entered the department prior to 1988 and therefore were grandfathred in to the older department blosscop policy. These freighters planned their shifts together and, while at work, smoked digars inside the truck bay. |

#### **APPENDIX B**

## Task 2: Qualitative Exposure Assessment

## Task 2: Qualitative Exposure Assessment

**FEBRUARY 25, 2021** 

### Tox Strategies

Innovative solutions
Sound science

## Task 2: Qualitative Exposure Assessment

**FEBRUARY 25, 2021** 

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#### Attachment 1 Qualitative Summary and Job Task Rating

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#### 1 Background and Rationale

ToxStrategies was contracted by the California Department of Industrial Relations (DIR), Commission on Health and Safety and Workers' Compensation (CHSWC), to conduct the study as outlined in California Assembly Bill (AB) 1400. AB 1400 was created to define the fire mechanics' risk of exposures to carcinogens in the course of employment. The study components include:

- Site visits to representative facilities in Los Angeles County, California
- Interviews and surveys with current and former fire mechanics
- Feasibility study to assess cancer incidence among fire mechanics
- Occupational exposure measurements of carcinogens found in the workplace, to evaluate potential exposure to carcinogenic materials
- Quantitative health risk assessment of potential increased cancer risk associated with exposure to carcinogens in the workplace.

ToxStrategies' approach to address these study components includes six tasks (provided in our proposal submitted to the DIR [ToxStrategies, Inc., 2020a]):

- Task 1: Structured literature review submitted and summarized below; ToxStrategies, Inc., 2020b
- Task 2: Qualitative exposure assessment provided herein
- Task 3: Epidemiologic assessment feasibility study of cohort enumeration for future epidemiologic study design
- Task 4: Quantitative exposure assessment measurement of current occupational exposures to carcinogens
- Task 5: Cancer risk assessment calculation of theoretical excess cancer risks from occupational exposure to carcinogens
- Task 6: Technical assistance to the DIR.

The results from Task 1, Structured literature review, demonstrated the paucity of literature available for characterizing potential carcinogenic exposures and cancer risks (epidemiologic studies) of fire mechanics. Occupation as a fire mechanic and risk of cancer has not been evaluated in the current scientific literature. No occupational chemical exposure studies explicitly focused on fire mechanics, fire mechanic cleaners, or fire-fighting vehicle maintenance workers. However, nine industrial hygiene studies presented data for fire stations and firefighting vehicles and/or gear, which likely overlap with the occupational exposures of fire mechanics who repair and clean firefighting vehicles. The chemical carcinogens evaluated in these studies included benzene, diesel exhaust, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), acetaldehyde, formaldehyde, crystalline silica, 1,4-dichlorobenzene, ethylbenzene, and styrene.

The purpose of Task 2, Qualitative Exposure Assessment, was to determine similar exposure groups (SEGs) among the fire mechanics and prioritize/define the scope of the quantitative exposure assessment, based on a risk ranking that incorporates the relative magnitude of the exposure potential, specifically for carcinogens (AIHA, 2015).

The objectives, methods, results, and conclusions of Task 2, Qualitative exposure assessment, are provided below. The remaining study tasks are described in Section 6.

#### 2 Objectives

The objectives of this qualitative exposure assessment were as follows:

- 1. Identify the fire mechanics' main facilities of operation within the County of Los Angeles Fire Department
- 2. Determine SEGs among the fire mechanics and determine representative exposure parameters
- 3. Provide an exposure ranking for each SEG to carcinogens identified in the facilities in order to prioritize the quantitative exposure assessment to those exposures that may pose the highest risk.

#### 3 Methods

ToxStrategies identified the County of Los Angeles Fire Department mechanics' classifications and three main facilities of operation with the assistance of member leaders from the American Federation of State, County & Municipal Employees (AFSCME) Local 119. The member leaders of AFSCME Local 119 included Mr. Gary Hodge, President of Union Local 119; Mr. Andreas Jung, President of Southern California District Council 36; and Luis Del Cid, member of Union Local 119.

The three main facilities of operation include:

- Eastern Fire Shop, located at 1104 N Eastern Avenue, Los Angeles, 90063
- North County Fire Shop, located at 42110 6th Street West, Lancaster, 93534
- Pacoima Air Operations/Breathing Apparatus (BA) Shop, located at 12605
   Osborne Street, Pacoima 91331.

AFSCME Local 119 union members include Automotive/Helicopter Mechanics and Equipment Maintenance Workers and Repairmen, employed by the County of Los Angeles (http://www.afscme36.org/afscme-local-119).

The four fire mechanic classifications are (1) Equipment Maintenance Worker, (2) Fire Equipment Mechanic (FEM), (3) Helicopter Mechanic, and (4) Helicopter Maintenance Inspector.

#### 3.1 Site Visits and Personnel Interviews

Site visits were conducted on September 15 and 16, 2020, by Ms. Deborah Proctor and Ms. Stephanie Vivanco of ToxStrategies. The purpose of the site visits (walk-around surveys) and personnel interviews (in-person and conference calls that occurred after the in-person site visits) was to gather information regarding chemical exposures of fire mechanics by recording observations of potential sources of exposures to chemical carcinogens at each location, as well as the manner in which these exposures may occur. The survey approach included identifying chemical agents in the workplace and discussing the overall job and specific work tasks conducted by each of the fire mechanic classifications. The survey goals were to understand how and when workers are exposed to the chemical agents, ascertain information regarding the availability and use of exposure controls (personal protective equipment [PPE], engineering/administrative controls, work practice controls), and discuss the evolution of chemical usage and work practices over time.

On September 15, Ms. Proctor and Ms. Vivanco visited Pacoima Air Operations and the Eastern Fire Shop. At Pacoima Air Operations, ToxStrategies, accompanied by Mr. Hodge, Mr. Jung, and Mr. Del Cid of AFSCME, met with Mr. Dennis Blumenthal, Chief Helicopter Maintenance of the Air Operations Section, who provided the facility tour and information regarding the various job tasks of helicopter mechanics at Air Operations. After the facility tour, ToxStrategies conducted in-person interviews with Mr. Tyrone Mathis, Helicopter Mechanic, and Mr. Brian Uhl, Helicopter Maintenance Inspector. Both Mr. Mathis and Mr. Uhl work at Pacoima Air Operations.

At the Eastern Fire Shop, ToxStrategies met with Deputy Fire Chief Thomas Ewald, Acting Division Chief Chad Idol; and Mr. Hodge and Mr. Del Cid of AFSCME. Mr. Hodge and Mr. Del Cid, both Fire Equipment Mechanics (shop-assigned at the Eastern Fire Shop), provided the facility tour and qualitative information on the typical job tasks of a Fire Equipment Mechanic. We also met with sheet metal assembly workers at the Eastern Shop.

On September 16, ToxStrategies visited the North County Fire Shop in Lancaster, California, and BA Shop in Pacoima, California. At the North County Fire Shop, ToxStrategies met with Mr. Mitch Connett, Assistant Chief of the Fire Fleet Services Division, along with Mr. Phillip De La Tova, Acting Senior Fire Equipment Mechanic (shop-assigned). Both Mr. Connett and Mr. De La Tova provided a facility tour, along with qualitative information on the typical job tasks. After the facility tour, ToxStrategies conducted an in-person interview with Mr. Neill Niblett, Fire Equipment Mechanic (field-assigned), and Mr. Niblett provided a tour of the Fire Station located on the same property as the North County Fire Shop in Lancaster (Fire Station 129).

At the BA Shop site visit, ToxStrategies met with Mr. Jared Snyder, Senior Equipment Maintenance Worker, who provided a facility tour and information regarding the typical

job tasks of an Equipment Maintenance Worker. The BA Shop includes mechanics who work on breathing apparatus and repair small engines and hoses.

On September 24, 2020, ToxStrategies conducted additional virtual interviews with the following personnel:

- Harry Wong, Fire Equipment Mechanic (field-assigned)
- Grant DeRose (known as "Sonny," now deceased), retired Fire Equipment Mechanic (field-assigned)
- Luis Del Cid, Fire Equipment Mechanic (shop-assigned), Eastern Fire Shop.

### 3.2 Records Review

ToxStrategies was provided copies of Safety Data Sheets (SDSs) used by the Fire Equipment Mechanics at the Eastern Fire Shop and the North County Fire Shop. However, SDSs for products used at the Pacoima Air Operations and BA Shop were not available; therefore, chemical usage information was obtained through the site visits and personnel interviews only.

No documentation regarding chemical usage changes over time was available for our review; however, anecdotal information was obtained through personnel interviews. The fire mechanic personnel who were interviewed for this project also stated that written process standards and operating procedures, health and safety programs, and employee exposure monitoring records are limited, and none could be provided to ToxStrategies. Therefore, our understanding of these issues is gleaned from personnel interviews.

## 3.3 Exposure Ranking for each SEG to Carcinogens

For jobs and tasks where potential exposure to a chemical carcinogen was identified, a qualitative exposure assessment tool was used to prioritize potential exposures, allowing ToxStrategies to target the DIR resources for Task 4 in the most cost-effective way. The tool was developed in accordance with the qualitative exposure assessment guidance from the National Institute for Occupational Safety and Health (NIOSH)<sup>2,3</sup> and the American Industrial Hygiene Association (AIHA, 2015). Information gathered from the site visits and personnel interviews was entered into a job task rating spreadsheet for each SEG (Attachment 1).

Each job task was characterized in terms of relevant chemical product usage information and/or fire residues encountered. The overall risk ranking was determined based on an exposure rating and health effect rating of the product and/or residue encountered by fire

https://www.cdc.gov/niosh/topics/oeb/default.html

<sup>3</sup> https://www.cdc.gov/niosh/topics/ctrlbanding/default.html

mechanics, by job task. Figure 1 shows the matrix that combines the exposure rating and health effect rating.

|                 | Health Effect Rating |     |          |      |           |
|-----------------|----------------------|-----|----------|------|-----------|
| Exposure Rating | 0                    | 1   | 2        | 3    | 4         |
| 4               |                      |     |          |      | Very High |
| 3               |                      |     |          | High |           |
| 2               |                      |     | Moderate |      |           |
| 1               |                      | Low |          |      |           |
| 0               | Trivial              |     |          |      |           |

Figure 1. Risk ranking matrix

Because carcinogen exposures were the focus of this assessment, only job tasks with carcinogen exposures are discussed below. Attachment 1-B presents the job task ranking spreadsheet for each SEG.

To calculate an overall risk rating, the following six steps were conducted:

1. The exposure rating was calculated by converting the job task frequency and duration to a points system, based on the matrix presented in Table 1. A low job task frequency and duration (e.g., >1/month and <15 minutes) yielded a lower point score (e.g., 1) than a job task with a higher job task frequency and duration. Columns B, C, and D of Attachment 1-B present the Task Duration, Task Frequency, and Frequency/Duration Rating, respectively.

Table 1. Job task frequency and duration rating system

|                      | Frequency of Job Task |                                                      |       |  |
|----------------------|-----------------------|------------------------------------------------------|-------|--|
| Job Task<br>Duration | >1/month              | >daily/<br><monthly< th=""><th>daily</th></monthly<> | daily |  |
| <15 min              | 1                     | 1                                                    | 1     |  |
| 15 min – 1 hr        | 1                     | 2                                                    | 2     |  |
| 1–2 hrs              | 1                     | 2                                                    | 3     |  |

| 2–4 hrs | 1 | 3 | 4 |
|---------|---|---|---|
| >4 hrs  | 1 | 4 | 5 |

Abbreviations: hr(s) = hour(s); min = minutes

2. A dispersion rating, indicative of a chemical's potential to be airborne, such that a worker could be exposed via inhalation, was determined by evaluating the vapor pressure of the individual carcinogens present in the product or identifying the carcinogen's dustiness factor (low, medium, or high, as described in Table 2). A low vapor pressure or "dustiness" (<25 mmHg [millimeters of mercury] or "low dustiness") yielded a lower dispersion rating than a high vapor pressure or "high dustiness," as shown on Table 2. In Attachment 1-B, column G presents the dispersion ratings for vapor pressure and dustiness for each job task.

Table 2. Dispersion rating system

| Chemical Vapor Pressure at 20°C or Dustiness Factor | Dispersion<br>Rating |
|-----------------------------------------------------|----------------------|
| <25 mmHg or 33 mbar                                 | 1                    |
| 25–100 mmHg or 33–133 mbar                          | 2                    |
| 100–250 mmHg or 133–333 mbar                        | 3                    |
| >250 mmHg or >333 mbar                              | 4                    |
| High Dustiness†: fine, light powders                | 4                    |
| Medium Dustiness†: crystalline granular solids      | 2                    |
| Low Dustiness†: Pellet-like, non-friable solids     | 1                    |

Abbreviations: mmHg = millimeters of mercury; mbar = millibar

3. An exposure control rating was determined by evaluating the job task engineering controls. Engineering controls are built into the workspace that protect the worker from harmful chemicals or contaminants by minimizing or eliminating its hazard (e.g., fume hood) (AIHA, 2015). For example, an open system with ineffective or no exposure controls yielded the highest control rating of "4," as shown on Table 3. Step 3 is also presented in columns H and I in Attachment 1-B.

<sup>†</sup> WHO, 1999.

Table 3. Level-of-control rating system

| Level of Control                                                                                                                               | Level-of-<br>Control<br>Rating |
|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Closed system; minimal potential for release to work environment                                                                               | 0                              |
| Semi-closed system; release potential at identified points; effective engineering controls in place at identified points                       | 1                              |
| Open system; effective engineering controls in place to contain/remove airborne contaminants; effective use of administrative and PPE controls | 2                              |
| Open system; some degree of engineering controls                                                                                               | 3                              |
| Open system; ineffective or no exposure controls                                                                                               | 4                              |

4. The ratings from Steps 1 through 3 were multiplied to obtain a job task exposure rating (Column J of Attachment 1-B). Based on the range of the result, an overall exposure rating was determined, as shown on Table 4 (Columns K and L of Attachment 1-B).

Table 4. Exposure rating system

| Multiplied <sup>†</sup> Total | Exposure Rating |
|-------------------------------|-----------------|
| <10                           | 0               |
| 10–20                         | 1               |
| 21–30                         | 2               |
| 31–40                         | 3               |
| >40                           | 4               |

<sup>†</sup> The multiplied total of the job task frequency/duration rating, carcinogen dispersion rating, and the level of control rating.

5. The health effect rating was determined by the Globally Harmonized System (GHS) Health Hazard Category, typically found on an SDS. Carcinogens are assigned either a Category 1 or 2 depending on the weight/strength of evidence, as determined by an identifying authoritative body (United Nations, 2011). Whether a chemical was classified as a carcinogen was determined using Cal/OSHA's

Hazard Communication Standard, which compiles listings from the following sources:<sup>4</sup>

- National Toxicology Program (NTP), "Report on Carcinogens" (NTP, 2016)
- International Agency for Research on Cancer (IARC) "Monographs on the Evaluation of Carcinogenic Risks to Humans" (IARC, 2020)
- Substances subject to regulation under the Occupational Carcinogen Control Act or that are regulated in Title 8, Article 110, Regulated Carcinogens (§5209, Carcinogens)
- Substances that meet the definition of "select carcinogen" in Title 8, Section 5191
- Where OSHA has included cancer as a health hazard to be considered by classifiers for a chemical covered by 29 CFR part 1910, Subpart Z.

The GHS category was converted to a health effect rating, as shown on Table 5 (and in columns M and N of Attachment 1-B).

Table 5. Health effects rating

| GHS Health Hazard Category† | Health Effects Rating |  |
|-----------------------------|-----------------------|--|
| Category 2                  | 3                     |  |
| Category 1                  | 4                     |  |

<sup>†</sup> Carcinogens only.

6. The exposure rating from Step 4 and health effects rating from Step 5 were combined to yield an overall risk ranking, ranging from "trivial" to "very high." The risk ranking matrix is provided below in Table 6 (and in column O of Attachment 1-B).

Table 6. Risk ranking matrix

| Health           |         | Exposure Rating |          |      |           |
|------------------|---------|-----------------|----------|------|-----------|
| Effects Rating 0 | 1       | 2               | 3        | 4    |           |
| 4                | Trivial | Moderate        | Moderate | High | Very High |
| 3                | Trivial | Moderate        | Moderate | High | Very High |

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<sup>&</sup>lt;sup>4</sup> Title 8 CCR §5194, Hazard Communication

# 4 Results

# 4.1 Determination of Representative Facilities

ToxStrategies corresponded by email and held two primary phone calls with AFSCME Local 119 representatives to determine which facilities would best represent the environment in which fire mechanics work. Specifically, we discussed the job titles of the personnel and the differences in the work tasks, as well as the physical locations where the fire mechanics work. Based on this information, ToxStrategies identified three main facilities of operation within the County of Los Angeles Fire Department as representative: the Eastern Fire Shop, the North County Fire Shop, and the Pacoima Air Operations/Breathing Apparatus (BA) Shop. Through interviews with mechanics and managers at these locations, we also recognized the category of field mechanics, who work across the county at local fire stations and at locations where fire equipment is dispatched, including wildfires. These mechanics do not work at the main facilities but have similar potential for exposure, because they contact the residue from fires that is on the surface of the apparatuses and equipment.

# 4.2 Determination of Similar Exposure Groups (SEGs)

The four fire mechanic classifications are (1) Equipment Maintenance Worker, (2) Fire Equipment Mechanic (FEM), (3) Helicopter Mechanic, and (4) Helicopter Maintenance Inspector. In fire mechanic classifications 1, 2, and 3, there is a further designation as either journey- or senior-level. The more experienced senior-level classification is the lead fire mechanic and typically performs more complicated tasks, and is responsible for providing technical guidance to the journey-level mechanics. However, we learned that journey- and senior-level mechanics have similar potential for exposure to carcinogens in the work environment. Approximately 72 mechanics are assigned to the Los Angeles Fire Department in the four classifications. Figure 1 presents the four fire mechanic classifications and their respective site locations. Of note, however, we recognize that there are other locations where fire mechanics work, including fire stations throughout the County, and these mechanics are designated as "field-assigned."

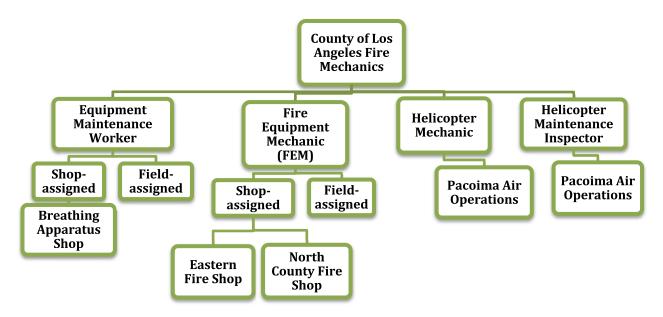


Figure 2. County of Los Angeles Fire Mechanics' four classifications and respective site locations

### 4.2.1 Equipment Maintenance Worker

The Equipment Maintenance Worker classification has a total of seven workers (six journey-level workers and one senior-level worker) with shop locations based in Pacoima (same site location as Pacoima Air Operations). Shifts are 40 hours per week, with overtime up to approximately 100 hours per year for each worker. Shop locations at Pacoima include the Breathing Apparatus (BA) Shop, Small Engine Repair Shop, and Fire Hose Repair Shop. These workers maintain and repair various types of equipment and tools at the Pacoima shops or in the field (other shop [Eastern Fire Shop or North County Fire Shop] or fire station locations). The Equipment Maintenance Workers will work in the field approximately 50% of their time, and any equipment that cannot be fixed in the field is sent to Pacoima.

Tasks include equipment examination and analysis of equipment malfunctions or mechanical failure. Other jobs include tuning up equipment used by the County fire stations, such as rescue tools, lawn mowers, vacuums, and generators, which can be performed in the Small Engine Repair Shop or in the field. Additionally, the workers are also responsible for repairing fire-truck hoses and completing the hose test, which takes place in the Fire Hose Repair Shop. Equipment such as firefighter BAs will typically be maintained and tested at the Pacoima BA Shop, while fit-testing of the BAs will typically be conducted at the fire station. BAs used during fire training in simulated structure burns, such as that conducted at the Los Angeles County Fire Department Fire Station 129 in Lancaster, California, are maintained at the BA Pacoima shop. These BAs reportedly offgas after use and appeared to have considerably more black fire residue than the BAs used by firefighters in the normal line of duty.

#### 4.2.2 Fire Equipment Mechanic (FEM)

Among the FEM classification, there are currently 48 mechanics, including eight at the senior level. The FEMs' shifts are 40 hours per week, plus overtime; typical overtime can sum to 200 hours over the course of one year for each FEM. Approximately half of the 48 mechanics are shop-assigned, and the other half are field-assigned: seven FEMs are assigned to the Lancaster Shop, 17 FEMs are assigned to the Eastern Shop, and 24 FEMs are assigned to the field. The mechanics that are shop-assigned work full time at either the Eastern Fire Shop or the North County Fire Shop. The field-assigned mechanics do not have an assigned work location, and their jobs can take place at any location, including a Los Angeles County fire station, wildfire base camp, roadside, or even at a fire site (known as the "red zone"). Because the field-assigned mechanics perform work wherever it is needed, they can spend a considerable amount of time in the car, driving to various locations.

Typically, field-assigned mechanics will work at a minimum of three fire stations but will have a base fire station where they conduct administrative tasks such as paperwork. Field duties typically include relatively minor repairs and service-scheduled items such as work on lights, sirens, batteries, and tires. However, based on personnel interviews, we understand that, recently, field-assigned mechanics have been assigned more major repairs, such as leaf spring changes, small transmission changes, fabrication of plumbing for pumps and supported equipment, seat change-outs, fluid changes, and water plumbing valve change-outs. Shop-assigned FEMs typically work on the major repairs such as engine and transmission changes, in-frame engine rebuilds, differential exchanges and rebuilds, major pump repair, plumbing issues, and water tank removal, and they are required to do more welding for significant parts repair and replacement. Additionally, field-assigned mechanics and shop-assigned mechanics have mandatory after-hours shifts throughout the year in which the field-assigned mechanic is the primary on-call mechanic and the shop-assigned mechanic is the backup.

The FEMs are responsible for the County-owned fleet from 175 fire stations/22 Battalions. The fleet consists of 217 total Engine Companies (Type I, Type III, and Type VI), 33 Truck Companies (Light Forces and Quints), 112 Paramedic Units (Air Squads, Assessment Engines, Assessment Quint/Light Force, Engines, and Squads), as well as reserve equipment (58 Engines, 10 Trucks/Quints, 31 Squads, and 21 Battalion SUVs).

#### 4.2.3 Helicopter Mechanic

There are fifteen Helicopter Mechanics, including three at the senior level, who are based out of Pacoima Air Operations. All the Helicopter Mechanics are required to have an airframe and power plant mechanic's certificate issued by the Federal Aviation Administration (FAA). Their shifts are typically 9-hour days with one day off every other week (9/80) plus overtime up to 500 hours per year per mechanic. Similar to the FEM, there may be required 24-hour shifts where the mechanic is on call during that time. Their job role consists of mechanical maintenance, repairs, and alterations to airframes, engines, and other components of helicopters owned and operated by the County. Heavier maintenance includes disassembling and reassembling airframes, engines, and other components and parts. Routine daily inspection and maintenance typically takes place

outdoors on the flight line or in a covered area off the flight line, while major helicopter repairs take place inside the hangar.

A Helicopter Mechanic may need to travel about once per month to the North County Fire Shop, because that site has a helicopter landing area. Otherwise, all maintenance and repairs are performed at Pacoima Air Operations. The Helicopter Mechanics are responsible for ten County-owned helicopters (five Bell 412s and five Firehawks).

## 4.2.4 Helicopter Maintenance Inspector

At Pacoima Air Operations, two Helicopter Maintenance Inspectors, with an Inspection Authorized Certificate issued by the FAA, work with the Helicopter Mechanics and perform all the inspections of completed repairs and alterations to ensure compliance with manufacturer's directives and federal regulations. About 60% of a Helicopter Maintenance Inspector's time is spent inspecting completed repairs and alterations, which may include airframes, power plant, propeller, or appliance, on both reciprocating and turbine-powered helicopters. The balance of their time is spent completing administrative tasks, such as ensuring that FAA-required reports and maintenance records are complete and in compliance with directives. Helicopter Maintenance Inspectors have a schedule similar to the Helicopter Mechanics (9/80) but may have more overtime hours than a helicopter mechanic (up to 650 hours per inspector per year). In addition, due to his specialty, one of the Helicopter Inspectors does most of the aircraft painting at the Pacoima Air Operations.

# 4.3 Exposure Ranking for Each SEG to Carcinogens

An overall risk ranking was calculated for each job task, for each SEG, as described in Section 3.3. The job task rating results are provided in Attachment 1-B, along with the Qualitative Summary in Attachment 1-A.

#### 4.3.1 Equipment Maintenance Worker

The overall qualitative risk ranking for the Equipment Maintenance Worker ranged from "trivial" to "high." The highest risk ranking for the Equipment Maintenance Worker was the job task of repair and tune-up of power equipment and rescue tools in the Engine Repair Shop. During the site visit on September 16, ToxStrategies observed strong gasoline odors when entering this shop location. According to communication with the Senior Equipment Maintenance Worker, Mr. Snyder, one Equipment Maintenance Worker works at this location full time, and three other Equipment Maintenance Workers work there part time. Personal protective equipment (PPE) includes latex gloves and an apron. There is one door that provides ventilation in this shop, but we were told that future plans include installing additional ventilation. Based on SDS review, the gasoline used for the various power equipment stored in the Engine Repair Shop is expected to contain three carcinogens—benzene, ethylbenzene, and naphthalene—and if the engines are run in the shop, this worker would also be exposed to gasoline engine exhaust.

The fire hose repair had an overall risk ranking of "moderate" based on the potential for off-gassing of fire-related fumes and the potential presence of soot, which is considered carcinogenic, as well as other unknown contaminants. One Equipment Maintenance

Worker works at the Fire Hose Repair Shop part time (>4 hours per day). The Fire Hose Repair Shop has a front door and additional roll-up doors that stay open during warmweather months. Personal protective equipment (PPE) includes latex gloves and an apron.

Equipment Maintenance Workers infrequently have to spray-paint equipment at their shops. PPE includes latex gloves and an apron. Based on review of the SDSs, the spray paints used by the workers may contain up to three carcinogens, depending on the specific product used. The carcinogens identified in the evaluated products are ethylbenzene, carbon black, and titanium dioxide. It should be noted that carbon black and titanium dioxide are considered carcinogenic only if they are "airborne, unbound particles of respirable size." Given the presence of these substances in a paint matrix, neither carbon black nor titanium dioxide would be present as unbound particles. Additionally, carbon black and titanium dioxide have been shown to be carcinogenic in the lung only in rodent bioassays and by a mechanism of pulmonary insoluble particulate overload, which is highly unlikely from occasional use of spray paint (IARC, 2010a). Based on the short task duration (approximately 30 minutes) and the low frequency of the task (three to five times per month), the overall risk ranking for spray painting was "trivial."

Table 7 includes the list the carcinogens identified as a potential exposure concern for the Equipment Maintenance Worker.

Table 7. Carcinogenic chemicals of potential concern (COPCs) identified in the Equipment Maintenance Worker

| Carcinogen Identified in Exposure Studies | Identifying Authoritative Body |
|-------------------------------------------|--------------------------------|
| Carbon black                              | IARC-2B                        |
| Titanium dioxide                          | IARC-2B                        |
| Engine exhaust, gasoline                  | IARC-2B                        |
| Benzene                                   | NTP-K, IARC-1, OSHA 1910.1028  |
| Soot                                      | NTP-K; IARC-1                  |
| Ethylbenzene                              | IARC-2B                        |
| Naphthalene                               | NTP-R, IARC-2B                 |

Abbreviations: NTP = National Toxicology Program; NTP-K = known to be human carcinogens; NTP-R = reasonably anticipated to be human carcinogens; IARC = International Agency for Research on Cancer; IARC-1 = carcinogenic to humans; IARC-2B = possibly carcinogenic to humans; OSHA = Occupational Safety and Health Administration

#### 4.3.2 Fire Equipment Mechanic (FEM)

The overall qualitative risk ranking for the FEM ranged from "trivial" to "very high," as presented in Attachment 1.

As clarified by the California Office of Environmental Health Hazard Assessment.

The job task of repairing fire apparatus or other equipment at a wildfire base camp or fire site resulted in the "very high" risk ranking. Depending on the number of wildfires that occur each year, the field-assigned FEMs may get called to a wildfire base camp<sup>6</sup> for approximately 2-week durations, 24 hours per day. During this time, the assigned FEMs are required to stay onsite for the duration of the period and are responsible for repairing any fire apparatus or fire equipment that is needed. Further, field-assigned FEMs may also get called to a fire site. Although infrequent (occurring approximately once every three years), the field-assigned FEM is responsible for needed fire apparatus repairs anywhere, at any time. Therefore, there are no exposure bounds for this group of workers and the level of PPE provided (work boots, work uniform, gloves, eye protection, N95 respirator) is less than that provided to the firefighters. The carcinogenic exposures of this job task, not including any carcinogenic exposures from chemical products used for the repair work, include fire smoke in the air, off-gassing of fire-related fumes, soot/fire residue on the apparatus and equipment, and other unknown contaminants. IARC reported concentrations of chemicals during wildland firefighting operations to be acetaldehyde, benzene, formaldehyde, and particulate matter (IARC, 2010b). Based on the data gathered from the County, and on professional judgment, ethylbenzene, naphthalene, PAHs, and diesel exhaust are also likely carcinogens of concern.

The shop-assigned FEMs at either the Eastern Fire Shop or the North County Fire Shop have facilities with roll-up doors and a diesel exhaust capture system that can be used when the apparatus is running inside the building, but those systems are not operating when the vehicles are moving in and out of the Shop. The Eastern Fire Shop also has side wall vents that exhaust air out of the building. ToxStrategies applied minimal levels of control assumptions (e.g., open system; some degree of engineering controls) when assessing an overall risk ranking for the field-assigned FEM, because the field-assigned FEMs do not have a standard maintenance work area, and the controls can be variable.

The highest risk ranking for the shop-assigned FEM of "moderate" was for daily maintenance of the fire apparatus, which is a highly variable job task and encompasses a wide range of products and tools. FEMs may use a combination of a face shield, gloves (rubber or latex), N95 respirator, and work boots when performing their job task. The daily maintenance of the fire apparatus occurs during the entire day, every day. The chemical ingredients of each product's SDS were evaluated for carcinogenicity and were included in the overall risk ranking. The carcinogens identified in the evaluated products include titanium dioxide, cumene, gasoline, benzene, ethylbenzene, naphthalene, carbon black, methyl isobutyl ketone, formaldehyde, diethanolamine, tetrachloroethylene, and N,N-dimethyl-p-toluidine. As discussed above, carbon black and titanium dioxide are not present in a matrix that would classify them as carcinogenic.

As described in Section 4.2.1, the fire hose, as well as other components of the fire apparatus, can have the potential for off-gassing of fire-related fumes and the potential

The outdoor base camps are a mobilization and staging area for firefighters and support personnel during a large wildfire.

Particulate matter is not considered an occupational carcinogen and, thus, is not discussed further.

presence of soot and other unknown contaminants. Diesel exhaust can also be a potential source of exposure for the FEMs when the apparatus is running. Therefore, soot and diesel exhaust were also included in the carcinogen list for this job task.

The other three job tasks with carcinogenic exposure yielded an overall risk ranking of "trivial," driven by the task duration and low vapor pressures/dustiness factors of the identified carcinogenic chemicals. These job tasks were (1) light welding and fabrication for the fire apparatus, (2) painting of fire apparatus components, and (3) wrapping the exhaust of the fire apparatus with vermiculite-coated fiberglass strips.

Light welding of sheet metal (stainless steel and aluminum) by shop-assigned FEMs may occur once per month for a maximum of one hour. PPE includes a welding helmet, welding gloves, and an N95 respirator. Carcinogens in welding fumes have the potential to be an exposure concern among FEMs, although, based on the short task duration and frequency, this job task resulted in a "trivial" risk rating.

Painting of fire apparatus components by the shop- or field-assigned FEMs takes place twice per month for a maximum of one hour total. PPE includes latex gloves, eye protection, and an N95 respirator. The potential carcinogens of concern identified in painting include titanium dioxide and methyl isobutyl ketone. However, as discussed above, titanium dioxide is not present in a matrix that is considered carcinogenic.

The job task of wrapping the exhaust of a fire apparatus with vermiculite-coated fiberglass strips may take up to one hour and may be performed every two weeks. The shop- or field-assigned FEM's PPE includes goggles (or other eye protection), latex gloves, and knee pads. Historically, vermiculite had the potential to contain traces of asbestos, which is a carcinogen. It is uncertain whether the vermiculite found in the currently used fiberglass strips contains trace asbestos and whether it is a potential exposure concern for the FEMs. Therefore, for the purposes of this risk ranking, it was conservatively assumed that the vermiculite-coated fiberglass strips used historically, and perhaps even the strips in current usage, contain trace asbestos. However, given the low dustiness of the fiberglass strips and the minimal duration and frequency of usage, this job task's overall risk ranking is considered "trivial."

Finally, exposure risk that was identified through the site visit and personnel interviews but was not attributable to use of a specific product includes the potential for exposure to diesel exhaust when the apparatuses enter or exit the shop, unknown potential for exposure to chemicals in the soot that exists on the equipment (e.g., hoses, ladders), off-gas from fire-contaminated equipment, and unknown contaminants on the underside and inside the mechanical compartments of the apparatus. As discussed above, field-assigned FEMs may be exposed to smoke at a fire, either by working at the wildfire base camp or at an actual fire.

Table 8 lists the carcinogens identified as potential exposure concerns for the FEM (shop-and field-assigned).

Table 8. Carcinogenic chemicals of potential concern (COPCs) identified in the FEM (shop- and field-assigned)

| Carcinogen Identified in Exposure Studies                                                                                                                                           | Identifying Authoritative Body                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Carbon black                                                                                                                                                                        | IARC-2B                                                                        |
| Cumene                                                                                                                                                                              | NTP-R, IARC-2B                                                                 |
| Titanium dioxide                                                                                                                                                                    | IARC-2B                                                                        |
| Engine exhaust, gasoline                                                                                                                                                            | IARC-2B                                                                        |
| Engine exhaust, diesel                                                                                                                                                              | NTP-R, IARC-1                                                                  |
| Benzene                                                                                                                                                                             | NTP-K, IARC-1, OSHA 1910.1028                                                  |
| Acetaldehyde                                                                                                                                                                        | NTP-R, IARC-2B                                                                 |
| Soot                                                                                                                                                                                | NTP-K; IARC-1                                                                  |
| Polycyclic aromatic hydrocarbons (PAHs) (Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenzo[a,h]anthracene, Indeno[1,2,3-c,d]pyrene) | NTP-R, IARC (1, 2A, or 2B) [classification dependent on specific PAH compound] |
| Ethylbenzene                                                                                                                                                                        | IARC-2B                                                                        |
| Naphthalene                                                                                                                                                                         | NTP-R, IARC-2B                                                                 |
| Methyl isobutyl ketone                                                                                                                                                              | IARC-2B                                                                        |
| Formaldehyde                                                                                                                                                                        | NTP-K, IARC-1, OSHA 1910.1048                                                  |
| Diethanolamine                                                                                                                                                                      | IARC-2B                                                                        |
| Tetrachloroethylene                                                                                                                                                                 | NTP-R, IARC-2A                                                                 |
| N,N-dimethyl-p-toluidine                                                                                                                                                            | IARC-2B                                                                        |
| Welding fumes                                                                                                                                                                       | IARC-1                                                                         |
| Asbestos                                                                                                                                                                            | NTP-K, IARC-1, OSHA 1910.1001                                                  |

Abbreviations: NTP = National Toxicology Program; NTP-K = known to be human carcinogens; NTP-R = reasonably anticipated to be human carcinogens; IARC = International Agency for Research on Cancer; IARC-1 = carcinogenic to humans; IARC-2A = probably carcinogenic to humans; IARC-2B = possibly carcinogenic to humans; OSHA = Occupational Safety and Health Administration

#### 4.3.3 Helicopter Mechanic / Helicopter Maintenance Inspector

The overall relative risk ranking for the Helicopter Mechanic and Helicopter Maintenance Inspector ranged from "trivial" to "very high." The highest risk ranking out of the identified job tasks for the Helicopter Mechanic was the heavy maintenance work on the aircraft, which yielded a ranking of "very high." Heavy maintenance of the aircraft typically takes place inside the hangar, and the mechanics generally wear a uniform, work boots, goggles/safety glasses, hearing protection, gloves (type dependent on task), and knee pads. The carcinogens of potential exposure include hexavalent chromium and crystalline silica. Hexavalent chromium dust/powder is reported to exist on the hot side of the engine. It was recently announced (July 2020) that hexavalent chromium could be present on the engine

and that the engine should not be cleaned by blowing air on to the surface. Prior to the announcement, the Helicopter Mechanic did not take special handling precautions when working with this piece of the engine. Therefore, exposure to hexavalent chromium during engine maintenance and repair may have been higher in the past. Based on the regularly scheduled service of the helicopters, it is very likely that the mechanic could routinely contact the dust on the engine, which might contain hexavalent chromium residues on a regular basis.

An additional exposure concern during the heavy maintenance work on the aircraft includes the talcum (talc) powder used on the surface of the fuel cells. The helicopter mechanics use the talc powder as an "anti-chaff" barrier between the rubber components and metal, such as in the case of the fuel cells. Talc is applied to a surface area of approximately 50 square feet, and based on the regularly scheduled service of the helicopters, the mechanics are exposed to fuel cells for approximately eight months of the year. Historically, talc contained the carcinogen asbestos, but asbestos has since been phased out. Currently, talc is known to contain 0.1% to 1% quartz, which is an exposure concern for the carcinogen, crystalline silica, but the percent composition is low.

A second opportunity for exposure to the talc powder on the fuel cells is when the mechanic has to check for oil leaks in the engine compartment, which requires the mechanic to crawl inside the aircraft's compartments where the deposited talc may be disturbed and become airborne in the confined area where air may be stagnant. This task occurs at a frequency of one hour (maximum), every three weeks. The PPE generally worn by the mechanic includes work boots, work uniform, and latex gloves. This job task yielded a risk ranking of "high," based on the potential for exposure to crystalline silica in the talc.

Several job tasks of the Helicopter Mechanic yielded a risk ranking of "moderate." These include the following: intermediate maintenance on the aircraft, painting/priming the interior/exterior of the aircraft, sanding and painting helicopter blades, and painting using aerosol paints and/or epoxy primers.

Intermediate maintenance on the aircraft takes place on a daily basis and can take approximately an hour to complete. This job is usually conducted outdoors on the flight line, and PPE includes work boots, work uniform, goggles/safety glasses, hearing protection, gloves (dependent on task), and knee pads. During the intermediate maintenance, a mechanic may potentially be exposed to carcinogens present in the various products used (e.g., Mastinox, Jet A fuel, Gunk Carburetor Cleaner, Bonderite Maintenance Cleaner), and could also be exposed to carcinogenic exhaust fumes and residues such as Jet A fuel exhaust and hexavalent chromium powder on the aircraft engine (discussed above). Soot and other residues are likely present on the aircraft exterior, especially during wildfire season, which can create an exposure concern for the helicopter mechanic. The carcinogenic chemicals of concern for this job task include hexavalent chromium, naphthalene, benzene, ethylbenzene, diethanolamine, and soot.

Painting, priming, and sanding of aircraft components can take place in the paint booth, inside the hangar, or outside in the open air, depending on the aircraft component. The mechanic may use a variety of different paints, paint strippers, primers, and enamels that

contain the carcinogens methylene chloride, hexavalent chromium, carbon black, titanium dioxide, 4-chlorobenzotrifluoride, and ethylbenzene. Depending on the paint job, it could take 30 minutes or less and be performed once per week, or it could take 10 hours a week and be performed for 40 hours a month. For the major paint jobs, the Helicopter Maintenance Inspector is the primary painter. His work typically takes place in the paint booth, with installed exhaust filters, with the use of an airline respirator.

Other tasks that mechanics perform that ranked as "trivial" include metal etching of small components and metal grinding on stainless steel, aluminum, or titanium metal parts. Metal etching requires the use of Alodine, which contains the carcinogen hexavalent chromium. Hexavalent chromium is a respiratory carcinogen, and there is very limited opportunity for it to be airborne as a result of the use of Alodine in this process. This task typically takes place in the Composite/Sheet Metal Room inside the hangar, or could take place on the aircraft itself. The job task frequency and duration is approximately 30 minutes, every three days. PPE generally worn for this task includes work boots, work uniform, and latex gloves. Metal grinding is also considered a low-frequency and low-duration task, because it typically takes five minutes to complete on a daily basis. PPE includes work boots, work uniform, latex gloves, hearing protection, and an N95 respirator. The metal grinding may produce dust that contains carcinogens, including hexavalent chromium, nickel, and titanium dioxide; however, these exposures are expected to be of low concentration and infrequent.

Finally, exposures to carcinogens that were identified through the site visit and personnel interviews, but were not attributable to use of a specific product, include helicopter engine exhaust (Jet A fuel exhaust), unknown chemicals in the soot residue, and off-gassing volatile chemicals from wildfire residuals on the equipment and surface of the aircraft. One helicopter mechanic stated during the site visit that the indoor hangar frequently gets filled with helicopter exhaust during landing and takeoff, due to its proximity to the helipad. All helicopters return to Air Operations each day for their 24-hour inspection; therefore, the Helicopter Mechanic (or Helicopter Maintenance Inspector) has frequent opportunities to be exposed to these contaminants, because they have to climb onto the aircraft at various locations and inspect exterior surfaces, usually without the use of PPE.

Table 9 includes the list of carcinogens identified as potential exposure concerns for the Helicopter Mechanics and Helicopter Maintenance Inspectors.

Table 9. Carcinogenic chemicals of potential concern (COPCs) identified in the Helicopter Mechanics and Helicopter Maintenance Inspectors

| Carcinogen Identified in Exposure Studies | Identifying Authoritative Body |
|-------------------------------------------|--------------------------------|
| Hexavalent chromium                       | NTP-K, IARC-1                  |
| Naphthalene                               | NTP-R, IARC-2B                 |
| Benzene                                   | NTP-K, IARC-1, OSHA 1910.1028  |
| Ethylbenzene                              | IARC-2B                        |
| Diethanolamine                            | IARC-2B                        |
| Methylene chloride                        | NTP-R, IARC-2A, OSHA 1910.1052 |
| Tetrahydrofuran                           | IARC-2B                        |
| Crystalline silica                        | NTP-K, IARC-1, OSHA 1910.1053  |
| 4-Chlorobenzotrifluoride                  | IARC-2B                        |
| Carbon black                              | IARC-2B                        |
| Soot                                      | NTP-K, IARC-1                  |

Abbreviations: NTP = National Toxicology Program; NTP-K = known to be human carcinogens; NTP-R = reasonably anticipated to be human carcinogens; IARC = International Agency for Research on Cancer; IARC-1 = carcinogenic to humans; IARC-2A = probably carcinogenic to humans; IARC-2B = possibly carcinogenic to humans; OSHA = Occupational Safety and Health Administration

# 5 Conclusions

The qualitative assessment identified four SEGs: (1) Equipment Maintenance Worker, (2) Fire Equipment Mechanic (FEM), (3) Helicopter Mechanic, and (4) Helicopter Maintenance Inspector. Several carcinogenic chemicals were identified in the products used by the various SEGs, and in the vehicle and aircraft exhaust emissions. Additionally, findings from Task 1, Structured Literature Review, indicated that PAHs in surface dust at fire stations and diesel emissions in fire-station vehicle bays could be elevated (Shen et al., 2012, 2015, Chung et al., 2020, Sparer et al., 2017, Echt et al., 1995, Froines et al., 1987) and off-gassing of benzene, ethylbenzene, 1,4-dichlorobenzene, and styrene have been measured in PPE that had been exposed to a fire (Fent et al., 2015). Finally, firefighter industrial hygiene samples collected during wildland firefighting demonstrated potential for low-level exposures to carcinogens such as crystalline silica, acetaldehyde, formaldehyde, PAHs, and benzene (Materna et al., 1992). Therefore, carcinogens may be present in the surface residuals on various fire equipment vehicles, PPE, and the surfaces of the shops themselves, as well as in the field when working near or at a wildland fire.

To determine whether the theoretical cancer health risk is elevated among this group of workers, the magnitude of the fire mechanics' exposures must be determined. This qualitative exposure assessment was the first step in characterizing the potential exposures. Based on the outcome of the risk ranking, ToxStrategies recommends conducting quantitative exposure assessments (i.e., measurements) of crystalline silica and hexavalent

chromium in personal breathing zone (pbz) air samples of the Helicopter Mechanics when (1) conducting heavy maintenance on the aircraft and (2) checking for oil leaks, which tasks received overall risk rankings of "very high" and "high," respectively. When the helicopter mechanics perform intermediate daily aircraft maintenance, ToxStrategies plans to collect pbz air samples to be analyzed for hexavalent chromium, naphthalene, benzene, and ethylbenzene. Although diethanolamine and tetrahydrofuran were also considered potential carcinogens of concern for this job task, these compounds will not be measured quantitatively, because they do not have published cancer potency measures. Thus, the cancer risk assessments for these chemicals will be qualitative. In addition to pbz air samples, surface samples will also be collected and analyzed for soot compounds for all three helicopter mechanic job tasks described above, as well as hexavalent chromium, when conducting intermediate daily aircraft maintenance.

For the Helicopter Mechanic/Helicopter Maintenance Inspector job tasks of (1) painting/priming on the interior and exterior of the aircraft, (2) sanding helicopter blades, (3) painting helicopter blades, and (4) painting using aerosol paints and epoxy primers, ToxStrategies plans to collect pbz air samples to be analyzed for hexavalent chromium, methylene chloride, 4-chlorobenzotrifluoride, and ethylbenzene. In addition to pbz samples, surface samples will also be collected during painting/priming on the interior and exterior of the aircraft and analyzed for hexavalent chromium. These four job tasks received an overall risk ranking of "moderate."

At the Engine Repair Shop located at the Breathing Apparatus Shop location, ToxStrategies plans to measure naphthalene, benzene, and ethylbenzene through pbz air samples, and soot compounds through surface samples. The Engine Repair Shop is where the equipment maintenance workers repair and tune up power equipment and rescue tools (e.g., weed trimmers, generators, and vacuums). This job task received an overall risk ranking of "high."

The Fire Hose Shop is also located at the Breathing Apparatus Shop location and is where the workers repair and complete the firefighting hose test. This job task received an overall risk ranking of "moderate." The plan is to collect surface samples at the Fire Hose Shop to be analyzed for soot compounds.

When the shop-assigned Fire Equipment Mechanic conducts general maintenance of the fire apparatus (overall risk ranking of "moderate"), ToxStrategies plans to collect pbz air samples of benzene, ethylbenzene, naphthalene, N,N-dimethyl-para-toluidine, tetrachloroethylene, diesel exhaust particulates, and welding fumes. Cumene and methyl isobutyl ketone were also considered potential carcinogens of concern for this job task; however, these compounds will not be measured quantitatively, because they do not have published cancer potency measures. Thus, their cancer risk assessment will be qualitative only. Surface samples will be collected and analyzed for soot compounds, and a bulk sample of the vermiculite-coated fiberglass strips will be analyzed for asbestos.

If possible, ToxStrategies also plans to collect pbz air samples from the field-assigned Fire Equipment Mechanics at a wildfire base camp, measuring acetaldehyde, benzene, ethylbenzene, formaldehyde, PAHs, naphthalene, and diesel exhaust particulates. Surface

samples will also be collected and analyzed for soot compounds. This job task received an overall risk ranking of "very high."

Table 10 is a summary of the measurement strategy for use in quantifying exposures incurred by the Fire Mechanics. As shown, the strategy includes measurements of air concentrations and surface levels of the identified carcinogens.

Table 10. Quantitative assessment strategy by SEG and job task

|                                         | Job Task Description                                                                              | Job Title                                                | Exposure Media and Chemicals                                    |                 |
|-----------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|-----------------|
| Site Location                           | Job Task Name                                                                                     | SEG                                                      | Air                                                             | Surface Residue |
| Air Operations,<br>Pacoima              | Heavy maintenance on aircraft (Cr[VI] on hot engine, talc powder on the surface of fuel cells)    | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | Crystalline silica,<br>Cr(VI)                                   | Cr(VI), soot    |
| Air Operations,<br>Pacoima              | Intermediate maintenance on aircraft (Cr[VI] on hot engine; Mastinox on bolts/metal)              | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | Cr(VI), naphthalene, benzene, ethylbenzene,                     | Cr(VI), soot    |
| Air Operations,<br>Pacoima              | Check for oil leaks (exposure to talc powder)                                                     | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | Crystalline silica                                              | Soot            |
| Air Operations,<br>Pacoima              | Painting / priming on the interior and exterior of the aircraft                                   | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | Methylene<br>chloride, Cr(VI)                                   | Cr(VI)          |
| Air Operations,<br>Pacoima              | Sanding helicopter blades                                                                         | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | Cr(VI)                                                          |                 |
| Air Operations,<br>Pacoima              | Painting helicopter blades                                                                        | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | 4-Chlorobenzo-<br>trifluoride,<br>methylene<br>chloride, Cr(VI) |                 |
| Air Operations,<br>Pacoima              | Painting using aerosol paints, epoxy primers                                                      | Helicopter Mechanic/ Helicopter<br>Maintenance Inspector | Ethylbenzene,<br>methylene<br>chloride, Cr(VI)                  |                 |
| Breathing<br>Apparatus Shop,<br>Pacoima | Repair and tune-up of power equipment and rescue tools (e.g., weed trimmers, generators, vacuums) | Equipment Maintenance Worker                             | Naphthalene,<br>benzene,<br>ethylbenzene                        | Soot            |

|                                                                               | Job Task Description                        | Job Title                             | Exposure Media                                                                                                                                     | and Chemicals                                                |
|-------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Site Location                                                                 | Job Task Name                               | SEG                                   | Air                                                                                                                                                | Surface Residue                                              |
| Breathing<br>Apparatus Shop,<br>Pacoima                                       | Fire hose repair                            | Equipment Maintenance Worker          |                                                                                                                                                    | Soot                                                         |
| Eastern Fire<br>Shop, Los<br>Angeles; North<br>County Fire<br>Shop, Lancaster | Maintenance of fire apparatus               | Shop/Field Fire Equipment<br>Mechanic | Benzene,<br>ethylbenzene<br>naphthalene, N,N-<br>dimethyl-para-<br>toluidine,<br>tetrachloroethyl-<br>ene, diesel<br>exhaust, welding<br>fumes     | Soot, bulk<br>sample of<br>fiberglass strips<br>for asbestos |
| Wildfire base<br>camp or fire site                                            | Repair of fire apparatus or other equipment | Field Fire Equipment Mechanic         | Acetaldehyde,<br>benzene,<br>ethylbenzene,<br>formaldehyde,<br>polycyclic<br>aromatic<br>hydrocarbons<br>(PAHs),<br>naphthalene,<br>diesel exhaust | Soot                                                         |

# 6 Next Steps

Task 4 will use the results of this study (Task 2) to conduct exposure monitoring of workers for airborne chemicals, as well as chemical analysis of surface residues, as summarized in Section 5 above. Samples from each SEG will be selected for personal breathing-zone air sampling and surface/dermal wipe sampling of equipment. Due to limitations of budget and schedule, sampling will focus on collecting data for the highest ranking possible exposure conditions.

Task 5 will use the results of Task 4 and will include calculating the theoretical excess cancer risk from exposure to carcinogenic materials for each SEG determined from Task 2 and toxicity criteria relevant for California risk assessments. The risk assessment will result in an estimate of the probability of developing cancer as a result of exposure, expressed in terms of the numbers of people out of one million. Varying degrees of conservatism will be added to this approach to ensure that cancer risk is not underestimated, which makes it probable that potential risk will be overestimated.

For Task 3, Epidemiologic assessment, employee records are being evaluated for completeness and suitability for a future cancer epidemiologic study.

Task 6 may include analyzing public comments, explaining the rationale for specific policy recommendations, and disseminating the study findings to the governor, state legislature, Occupational Safety and Health Standards Board, Los Angeles County Board of Supervisors, and stakeholders in the workers' compensation system.

# 7 References

AIHA (American Industrial Hygiene Association). 2015. A Strategy for Assessing and Managing Occupational Exposures. 4<sup>th</sup> Edition. American Industrial Hygiene Association, Falls Church, VA.

Chung J, Demers PA, Kalenge S, Kirkham TL. 2020. Career fire hall exposures to diesel engine exhaust in Ontario, Canada. J Occup Environ Hyg 17(1):38–46, doi:10.1080/15459624.2019.1691729.

Echt A, Sheehy J, Blade L. 1995. Case studies: Exposure to diesel exhaust emissions at three fire stations: Evaluation and recommended controls. Appl Occup Environ Hyg 10(5):431–438.

Fent KW, Evans DE, Booher D, Pleil JD, Stiegel MA, Horn GP, Dalton J. 2015. Volatile organic compounds off-gassing from firefighters' personal protective equipment ensembles after use. J Occup Environ Hyg 12(6):404–414, doi:10.1080/15459624.2015.1025135.

Froines JR, Hinds WC, Duffy RM, Lafuente EJ, Liu WC. 1987. Exposure of firefighters to diesel emissions in fire stations. Am Ind Hyg Assoc J 48(3):202–207, doi:10.1080/15298668791384634.

IARC (International Agency for Research on Cancer). 2010a. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 93, Carbon Black, Titanium Dioxide, and Talc. Occupational Cancer Research Centre, <a href="https://monographs.iarc.fr/wp-content/uploads/2018/06/mono93.pdf">https://monographs.iarc.fr/wp-content/uploads/2018/06/mono93.pdf</a>

IARC (International Agency for Research on Cancer). 2010b. IARC Monographs on the evaluation of carcinogenic risks to humans, Volume 98, Painting, firefighting, and shiftwork. Occupational Cancer Research Centre, <a href="https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/">https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/</a>.

IARC (International Agency for Research on Cancer). 2020. IARC Monographs on the identification of carcinogenic hazards to humans, agents classified by the IARC Monographs, Volumes 1–127. Updated on June 26. <a href="https://monographs.iarc.fr/agents-classified-by-the-iarc/">https://monographs.iarc.fr/agents-classified-by-the-iarc/</a>.

Materna BL, Jones JR, Sutton PM, Rothman N, Harrison RJ. 1992. Occupational exposures in California wildland fire fighting. Am Ind Hyg Assoc J 53(1):69–76, doi:10.1080/15298669291359311.

NTP (National Toxicology Program). 2016. Report on Carcinogens, Fourteenth Edition. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. <a href="https://ntp.niehs.nih.gov/go/roc14">https://ntp.niehs.nih.gov/go/roc14</a>.

Shen B, Whitehead TP, McNeel S, Brown FR, Das R, Israel L, et al. 2012. Measurements of PAHs, PBDEs, and PCBs in dust from California firehouses. Organohalogen Compounds 74:899–902.

Shen B, Whitehead TP, McNeel S, Brown FR, Dhaliwal J, Das R, et al. 2015. High levels of polybrominated diphenyl ethers in vacuum cleaner dust from California fire stations. Environ Sci Technol 49(8):4988–4994.

Sparer EH, Prendergast DP, Apell JN, Bartzak MR, Wagner GR, Adamkiewicz G, et al. 2017. Assessment of ambient exposures firefighters encounter while at the fire station: An exploratory study. J Occup Environ Med 59(10):1017–1023, doi:10.1097/JOM.000000000001114.

ToxStrategies, Inc. 2020a. Proposal in response to RFP #4479, Assessment of risk of carcinogens exposure and incidents of occupational cancer among mechanics and cleaners of firefighting vehicles, Volume 1 — Proposal. February 13.

ToxStrategies, Inc. 2020b. Structured literature review of potential occupational exposures and cancer among mechanics who repair and clean firefighting vehicles (Task 1). August 24.

United Nations. 2011. Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Fourth revised edition. ST/SG/AC.10/30/Rev.4.

WHO (World Health Organization). 1999. Hazard prevention and control in the work environment: Airborne dust. WHO/SDE/OEH/99.14. Chapter 4, Recognizing and Evaluating the Problem—the Systematic Approach.

# **ATTACHMENT 1**

# **Qualitative Summary** and Job Task Rating

|                      | Overall Risk<br>Ranking                                                                       | Very High                                                                                             | Very High                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|                      | Health Effect Rating<br>of Product or<br>Residue<br>[AUTOMATIC FILL]                          | <b>+</b>                                                                                              | 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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|                      | Exposure Rating of<br>Product or Residue<br>IAUTOMATIC FILLI                                  | 4                                                                                                     | vi.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | e                                                                              | m                                                                                                                                | c                                                                                                                                                                                                                                                                     | 2                                                                                                                                                                                                          | v                                                                                                                                                                                          | 2                                                                                                                                                                                                                                                                                            | - 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| CHEMICAL INVENTORY   | Usage Rate of<br>Chemical Products<br>Used during Job Task                                    |                                                                                                       | pau jad saguent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                                                 | Dependent on aircraft<br>piece being painted                                                                                                                                                               | rot applicable                                                                                                                                                                             | ependent on aircraft lece being painted                                                                                                                                                                                                                                                      | Nece being painted                                                                                                                                                                 | Na needed                                               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appilcable                                                                                                                     |
|                      | No. of Employees Us<br>with Job Title that CI<br>perform Job Task Us                          | 24                                                                                                    | 1.7<br>44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| JOB TITLE            | N W VOD Title                                                                                 |                                                                                                       | discippen Machanic<br>elecoper Maintenance<br>156-050 Maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                                                 | Helicopter Mechanic/<br>Helicopter Maintenance<br>Inspector                                                                                                                                                | Helicopper Mannenance<br>Helicopper Mannenance<br>Inspector                                                                                                                                | Helioopker Machanic<br>Helioopker Mainkenance<br>Inspector                                                                                                                                                                                                                                   | Helicopter Mechanic/<br>Helicopter Maintenance<br>Inspector                                                                                                                        | Shop Field Fire Equipment<br>Mechanic                   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Equipment Maintenance<br>Worker                                                                                                    |
|                      | Notes/ Observations                                                                           |                                                                                                       | These is awayes Bell 412 for forming<br>council in the hanges, and it is more allowing<br>they was in the council in the council in the<br>hange in the council in the council in the<br>mortal and in the council in the<br>hange in<br>hange in the<br>hange in the<br>hange in the<br>hange in<br>hange in<br>ha | The work space inside the engine area it is fight and known as the Thell hole. | The shop had noticeable gasoline fumes. Four workers are part-time in the small engine repair shop, and one worker is full-time. | Statement frequency contacts from<br>residue, (even operating up helicopter<br>door). Massilnox is used to osat botts or<br>metal that comes into contact with<br>metal of another type.                                                                              |                                                                                                                                                                                                            | geween, January and September<br>2020; the Helicopoler Maintenance<br>Inspector has spent ~20 note to peint<br>such bards and completed 8 bades so<br>are fincludes sanding and peinting). | her peint booth's exhaust filters and<br>the peint booth's exhaust filters and<br>efficiency. Between lanuary and<br>efficiency. Between lanuary and<br>Maintenance inspector has spent-20<br>nours to paint each bidde and<br>completed 8 blades as far (includes<br>sending and painting). | PPE is not enforced and is used on a returnary basis                                                                                                                               | PPE is not enforced and is used on a voluntary besis; not readily available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Only one worker at the hose repair shop, will spend half of the time in the field (fire station, shop, etc.)                       |
| RE CONTROLS          | Personal Protective<br>Equipment                                                              | Work boots, work uniform,<br>latex gloves, eye protection,<br>N95 respirator                          | Whit books, work uniform, aggressately places, work uniform, aggressately places, sealing protection, gloves depends on bask), knee pads (depends on bask), knee pads                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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because the job<br>requires feeling parts of<br>aircraft for crecks, grooves,<br>etc.] | Nork baots, work uniform,<br>goggles, hearing protection,<br>atex gloves, knee pads,<br>supplied air respirator or N95<br>respirator                                                                       | Vork boots, work uniform,<br>loggles, hearing protection,<br>alax gloves, knee pads,<br>upplied air respirator                                                                             | Work booss, work uniform, gosgles, hearing protection, latex gloves, knee pads, supplied air respirator.                                                                                                                                                                                     | Work boots, work uniform, goggles, hearing protection, vigagles, hearing protection, vigagles, gloves, knee pads, supplied air respirator respirator                               | Face shield, gloves (rubbar or<br>lelev.), N95 respirator,<br>uniform, work boots                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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Work books, work uniform,<br>latex gloves and apron (since<br>last 2 years only)                                                   |
| EXPOSURE             | Administrative<br>Controls (e.g., job task<br>rotation, chemical use Pe<br>limitations, etc.) |                                                                                                       | 0.00U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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                                                                                 | anana                                                                                                                                                                                                      | none                                                                                                                                                                                       | W 99 99 81 81 81 81 81 81 81 81 81 81 81 81 81                                                                                                                                                                                                                                               | Wone 92 92 92 92 92 92 92 92 92 93 93 93 93 93 93 93 93 93 93 93 93 93                                                                                                             | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | None Is                                                                                                                            |
|                      | Engineering Controls (e.g.,<br>process enclosures, local<br>exhaust ventilation, etc.)        | None (ouiside adjacent to<br>burning fire)                                                            | Swarp cooker, flour are<br>generators, portable A/C<br>generators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Vone                                                                           | None (just front door natural air<br>ventilation); future ventilation is<br>planned to be installed                              | Work conducted outdoors in open air                                                                                                                                                                                                                                   | Paint booth exhaust filters and A/C inside the paint booth; weamp coolers and A/C in the nangar; outside open air.                                                                                         | Paint booth: exhaust filters, AVC; outside open air                                                                                                                                        | Paint booth: exhaust filters, A/C                                                                                                                                                                                                                                                            | Paint booth exhaust filters and AIC inside the paint booth; swamp coolers and AIC in the hangar; outside open air.                                                                 | Side verte in shop; diesel<br>ekhalet cepture area; shop has<br>roll-up doors (natural air); lans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Doors and roll-up doors open during warm weather months; AVC provided by swamp cooler; heater available during cold-weather months |
|                      | Job Task Duration,<br>Frequency, Variability                                                  | ds per de                                                                                             | Use of Biolis et 6 menuses. 18 menuses et al. 19                                                                                                                                                                                                                                                                                                                                                 | 16 min - 1 haur every 3 weeks P                                                | 4 hours per day; daily                                                                                                           | of minutes: daily minutes; daily                                                                                                                                                                                                                                      | 8                                                                                                                                                                                                          | To hours/week or 40 hours per month                                                                                                                                                        | 30 minutes or less/week                                                                                                                                                                                                                                                                      | Depards on part size and Paint both exhaust filters and need; generally 30 minutes or AC inside the paint booth; elestweek sweek hangari outside open air hangari outside open air | Ni day, daily                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | >4 hours per day; dally                                                                                                            |
|                      | Job Task Description                                                                          |                                                                                                       | The but is used on the death control between between between to between the but of the the b                                                                                                                                                                                                                                                                                                                                                 | Check for oil leaks in engine                                                  | Nokers repair and tune up power equipment                                                                                        | _ = >                                                                                                                                                                                                                                                                 | ig using canned paint or aerosol                                                                                                                                                                           | Sand bladdes or other aircraft please prior to building                                                                                                                                    | Sprey painting using canned paint or aerosot                                                                                                                                                                                                                                                 |                                                                                                                                                                                    | respectively imposfor of opposition  | Noker repairs and completes the hose test, replace nozzles and shut-offs as needed.                                                |
| JOB TASK DESCRIPTION | Chemical Product Used or Residue Encountered (AUTOMATIC FILL)                                 | Fin smooth in the aire and cooffine residues on the apparatus and/or equipment, unknown contentrants. | Coveral Commission Agency Tab., Technical (Makestos) Teor) Technical Commission CPA(I) residues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Chemical Commodities Agency Tals, Technical (Asbestos fee)                     |                                                                                                                                  |                                                                                                                                                                                                                                                                       | Authority of Starting the Law VOC Polyumstane Phinne - Black; 3M Society Ride Epoxy Adhesiwe EC-2216, Rusk-deum Conposition Enamel, Henkel onderine Sist 1551 J. AERO brown as TURCO 5551 (paint atrapper) | unied sou                                                                                                                                                                                  | Adall brind traditistic Brought (AV CD Popuration Primer - Black 3/M Scott) 8<br>Wheel Epoy Adhessee (E-2216 R. Late oleum Corporation Fameri, Herkel<br>Bonderlike S-6T 5551 AERO brown as TURCO 5551 (paint stripper)                                                                      | 3M South-Weid Egory Adhesive E-2216 Tratedelum Corporation Enemel, 18 Hernal Bondenins S-51 531 AERO known as TURCO 5351 (paint athipper) p                                        | TRANCO MIC ORGANIC UNITED ESCA DIFFICULTO EXCEPT CHIPPORT IN the management of present enhance. The control of the management of the chipport of the management of the chipport of the management of the chipport of the chipp | Of gassing of the related tumes, sook unknown conteminants                                                                         |
|                      | Task Location<br>Description                                                                  | Outdoors at a wildfre base camp or fire site                                                          | Indoor Hangar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Indoor Hangar                                                                  | Engine Repair Shop                                                                                                               | Outside on fight line                                                                                                                                                                                                                                                 | Paint Booth / Indoor<br>Hangar / Outside in<br>open air                                                                                                                                                    | Major sanding (down to D<br>the mest) takes place<br>in the Paint Booth while<br>light sanding is<br>performed outside<br>(open air)                                                       | Paint booth                                                                                                                                                                                                                                                                                  | Paint Booth / Indoor<br>Hangar / Outside in<br>open air                                                                                                                            | Machanic shop; outside, fire station bay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fire Hose Repair shop                                                                                                              |
|                      | on Job Task Name [AUTOMATIC FILL]                                                             |                                                                                                       | Newsy manifestation on instructing or lost regime, this provider on the authors of final ceitile.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Check for oil leaks (exposure to taic powder)                                  |                                                                                                                                  | Namodala resilentance on aircraft (CNV) on hot engine, Mastinox on bolishinetal)                                                                                                                                                                                      | Painsting I priming on the interior and exterior of the elicraft                                                                                                                                           | Sanding helicopes blades                                                                                                                                                                   | Painfing helicopter blades                                                                                                                                                                                                                                                                   | Painfing using aerosol paints, epoxy primers                                                                                                                                       | Manherance of fee apparatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Fire hose repair                                                                                                                   |
|                      | Site Location                                                                                 | Wildfire base<br>camp or fire<br>site                                                                 | Air<br>Operations,<br>Pacoima                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Air<br>Operations,<br>Pacolma                                                  | Breathing<br>Apparatus<br>Shop,<br>Pacoima                                                                                       | Air<br>Operations,<br>Pacoima                                                                                                                                                                                                                                         | Air<br>Operations,<br>Pacoima                                                                                                                                                                              | Air<br>Operations,<br>Pacolma                                                                                                                                                              | Air<br>Operations,<br>Pacoima                                                                                                                                                                                                                                                                | Air<br>Operations,<br>Pacoima                                                                                                                                                      | Eastern Fire Shop, Los Angeles: Angeles: North County Fire Shop, Lancaster                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Breathing<br>Apparatus<br>Shop,<br>Pacoima                                                                                         |

| _                    |                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                           |                                                                                  |                                                                                                                                                          |                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | Overall Risk<br>Ranking                                                                | Trivial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Trivial                                                                                                                                   | Trivial                                                                          | Trivial                                                                                                                                                  | Trivial                                                                                                               | Trivial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                      | Health Effect Rating<br>of Product or<br>Residue                                       | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | nt.                                                                                                                                       | च                                                                                | च                                                                                                                                                        | e                                                                                                                     | es                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                      | Exposure Rating of<br>Product or Residue                                               | ٥                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                                         | 0                                                                                | 0                                                                                                                                                        | 0                                                                                                                     | o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CHEMICAL INVENTORY   | Usage Rate of<br>Chemical Products<br>Used during Job Task                             | or fiess                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Not applicable                                                                                                                            | Not applicable                                                                   | 1 time every 2 weeks to a<br>month                                                                                                                       | As needed                                                                                                             | Ав певион                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | No. of Employees<br>with Job Title that<br>perform Job Task                            | 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 17                                                                                                                                        | 248                                                                              | 4.6                                                                                                                                                      | 448                                                                                                                   | ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| JOB TITLE            | N N N                                                                                  | r Manhanici<br>r Manhanance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Helicopter Maintenance<br>Helicopter Maintenance<br>Inspector                                                                             | Shop Fire Equipment<br>Mechanic                                                  | ShopiField Fire Equipment<br>Mechanic                                                                                                                    | Shop Fire Equipment<br>Mechanic                                                                                       | Equipment Maintenance<br>Worker                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                      | Notes/ Observations                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PPE is not enforced and is used on a voluntary basis.                                                                                     | PPE is not enforced and is used on a voluntary basis; not readily available.     | PPE is not enforced and is used on a voluntary basis; not readily available. Wrapping the exhaust with the floerglass strips may cause demai irritation. | PPE is not enforced and is used on a<br>voluntary basis; not readily available.                                       | Mick books, well, with Mick and American and |
| EXPOSURE CONTROLS    | se Personal Protective<br>Equipment                                                    | Work books, work uniform, gloves (elex.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Work boots, work uniform,<br>gloves (labox), hearing<br>protection, N95 respirator                                                        | Work boots, work uniform,<br>welding helmet, welding<br>gloves, N95 respirator   | Work books, work uniform,<br>goggles, hearing protection,<br>latex gloves, knee pads                                                                     | Work boots, work uniform,<br>latex gloves, eye protection,<br>N95 respirator                                          | Work books, work uniform, latex gloves and apron (alnoe lest 2 years only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ä                    | Administrative Controls (e.g., job task rotation, chemical use limitations, etc.)      | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | None                                                                                                                                      | None                                                                             | None                                                                                                                                                     | None                                                                                                                  | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                      | Engineering Controls (e.g.,<br>process enclosures, local<br>exhaust ventilation, etc.) | Мосто                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5 minutes; 1 per week or 1 per Swamp coolers and AC in the hangar                                                                         | Portable fan                                                                     | Nane                                                                                                                                                     | None                                                                                                                  | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                      | Job Task Duration,<br>Frequency, Variability                                           | 30 minutes, conce every 3 days                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5 minules; 1 per week or 1 per<br>day                                                                                                     | 1 hour per month                                                                 | 15 min - 1 hour every 2 weeks None to a month                                                                                                            | 30 minutes, twice a month                                                                                             | Up to 30 minutes, 3-5 times per manth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                      | Job Task Description                                                                   | Place a seal occurrence in paties the sign of<br>Place a seal occurrence in paties the sign of<br>a larger places against a based on the<br>angest places against the wholen<br>wholen in particular the sign of<br>predictor filled (places to the places the<br>predictor filled (places to the places to<br>places the places to the places to<br>places the places the<br>places the places the<br>places the places the<br>places the places the<br>places the<br>p | Grind metal (atuminum, staintess steel); apply demical treatment after grinding (Aodine, corrosion prevention compounds, or epoxy primer) | Weiding sheet metal (stainless steel & aluminum)                                 | Wapping exhaust                                                                                                                                          | Painting                                                                                                              | Spray painting using aerosol paints                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| JOB TASK DESCRIPTION | Chemical Product Used or Residue Encountered (AUTOMATIC FILL)                          | Composition Metall (Bendemb M-CR 100) AERO Incom as Ancidne 100).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Motest clust                                                                                                                              | Vecling metal fames                                                              | Adequate aron, Machaser Care Staply Co Yermoulie Coate Fleeglass Strps 18" TH visible fire station by (historically contained sabestes)                  | Kiriball Molevest NASI ST GRAY Pent, Kiriball Molevest GLOSS WHITE paint, Kiriball Molevest NEW EXUIPAENTYELLOW paint | The Control Problem State Stat |
|                      | Task Location Description Correspond Sinest Metal Room                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Indoor Hangar                                                                                                                             | Mechanic shop                                                                    | Mechanic shop;<br>outside; fire station bay I                                                                                                            | Mechanic shop                                                                                                         | Engine Repair Shop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                      | Site Location Job Task Name (AUTOMATIC FILL)                                           | Exhing small components using Alodine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Metal grinding on stainless steel, aluminum, stantum                                                                                      | light welding & statrication for fire apparatus                                  | wrapping exhaust                                                                                                                                         | Painting of fre apparatus components                                                                                  | spending equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| L                    | Site Location                                                                          | Air<br>Operations,<br>Pacolma                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Air<br>Operations,<br>Pacoima                                                                                                             | Eastern Fire<br>Shop, Los<br>Angeles;<br>North County<br>Fire Shop,<br>Lancaster | Eastern Fire<br>Shop, Los<br>Angeles;<br>North County<br>Fire Shop,<br>Lancaster                                                                         | Eastern Fire<br>Shop, Los<br>Angeles;<br>North County<br>Fire Shop,<br>Lancaster                                      | Breathing<br>Apparatus<br>Shop,<br>Pacolma                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Attachment 1-B. Job Task Rating

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# **APPENDIX C**

# Task 3: Epidemiology Feasibility Study

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**FEBRUARY 25, 2021** 

# Tox Strategies

Innovative solutions
Sound science

# Task 3: Epidemiology Feasibility Study

**FEBRUARY 25, 2021** 

#### **PREPARED FOR:**

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# 1 Background and Rationale

The International Agency for Research on Cancer (IARC) and recent epidemiologic studies have suggested that firefighters may be at increased risk for certain cancers due to their occupational exposures to carcinogens found in fire gases and smoke (e.g., benzene, polycyclic aromatic hydrocarbons [PAHs], cadmium, crystalline silica), as well as exposures to other agents (e.g., diesel exhaust) (IARC, 2010; LeMasters et al., 2006; Tsai et al., 2015). Since January 1, 2012, firefighters have been included in the California Cancer Presumption for worker compensation purposes (California Labor Code §3212.1). With these benefits, a firefighter who develops cancer can be awarded compensation for medical treatment and disability benefits, if the individual demonstrates that he or she was exposed to a carcinogen during the course of their employment. In comparison, mechanics who repair and clean firefighting vehicles and equipment are not covered by this worker compensation program. Repairing and cleaning firefighting vehicles and equipment (trucks, helicopters, axes, hoses, etc.) at a fire station or offsite at a fire event may expose the mechanics to fire-related carcinogens, similar to those experienced by the firefighters.

As a result, California Assembly Bill (AB) 1400 was created to define the fire mechanic's risk of exposures to carcinogens in the course of employment (AB 1400, 2019). Specifically, AB 1400, Section 77.7, was added to the Labor Code on October 11, 2019, and requires the Commission on Health and Safety and Workers' Compensation (CHSWC), in partnership with the County of Los Angeles (LA County) and relevant labor organizations, to submit a study to the Legislature, the Occupational Safety and Health Standards Board, and the Los Angeles County Board of Supervisors "on the risk of exposure to carcinogenic materials and incidence of occupational cancer in mechanics who repair and clean firefighting vehicles" (Labor Code, 2019). The study components include:

- Site visits at representative facilities in Los Angeles County, California
- Interviews and surveys with current and former fire mechanics to assess potential exposures to carcinogens
- Occupational exposure measurements of carcinogens identified as potentially present in the workplace, to evaluate potential exposure to carcinogens
- Quantitative health risk assessment of potential increased cancer risk associated with exposure to carcinogens in the workplace.

ToxStrategies was contracted by the California Department of Industrial Relations (DIR), CHSWC, to conduct the study as outlined in AB 1400. ToxStrategies' approach to address these study components includes six tasks:

- Task 1: Structured Literature Review summary of available scientific literature on exposure to chemical carcinogens and studies of cancer risk among fire mechanics
- Task 2: Qualitative Exposure Assessment site visits at representative facilities

- Task 3: Epidemiologic assessment feasibility study of cohort enumeration
- Task 4: Quantitative Exposure Assessment measurement of current occupational exposures to carcinogens
- Task 5: Cancer risk assessment calculation of theoretical excess cancer risks from occupational exposure to carcinogens
- Task 6: Technical assistance to the DIR.

The purpose of Task 3 (epidemiologic assessment) is to determine the feasibility of conducting an epidemiology study to assess the risk of cancer in fire mechanics. A feasibility study helps to determine whether a full epidemiologic study is warranted based on availability of data and potential number of participants. Conducting an epidemiologic study without this first step would likely waste limited resources and may not provide meaningful results. This report summarizes the objectives, methods, and results of the epidemiologic feasibility study and discusses recommendations for next steps.

# 2 Objectives

The objectives of Task 3 were as follows:

- 1. Evaluate employee records for completeness and suitability for a cancer study.
- 2. Ascertain availability of information in employee records for assessing disease confounders (e.g., smoking).
- 3. Develop recommendation for the appropriate epidemiology design.

# 3 Methods

Evaluating a potential risk of cancer for a specific occupation is most commonly conducted using a cohort study, which is an epidemiologic study design in which populations are assembled based on a common factor (e.g., employment as a fire mechanic), observed over time, evaluated for risk factors, and followed for a particular outcome. Cohort studies can be either prospective, where exposure to risk factors is evaluated as part of the study, and participants are followed forward in time, or retrospective, where exposures occurring in the past are used to define cohorts, and the outcomes have already occurred.

To assess the feasibility of assembling a retrospective cohort of fire mechanics in LA County to evaluate the risk of cancer, the following steps were taken:

- 1. Determine that occupation as an LA County fire mechanic can be ascertained and verified, typically through employment records (*exposure verification*).
- 2. Ensure that the outcome of cancer can be ascertained and verified through a relevant cancer registry or medical records that can be linked to cohort participants (*outcome ascertainment*).

- 3. Evaluate the size of the potential cohort by determining the number of people who ever held the occupation of interest (fire mechanics) during a specific timeframe (*cohort enumeration*).
- 4. Determine the availability of demographic and socioeconomic characteristics and medical history factors that may confound the relationship between occupation and cancer (*confounding variables*).

If a retrospective cohort of fire mechanics can be assembled and tracked for cancer outcomes, the incidence or mortality rates for certain cancers can be calculated within the cohorts and subsequently compared to the cancer rates of a comparable population to determine whether this occupation has higher (or lower) than expected rates of cancer.

ToxStrategies evaluated the feasibility of constructing a cohort of fire mechanics at LA County Fire and following them for cancer outcomes. ToxStrategies first conducted qualitative interviews with relevant LA County Fire personnel, including three fire equipment mechanics, the president of the American Federation of State, County and Municipal Employees (AFSCME) union local 119, and a representative from LA County Fire human resources (HR), to gauge the scope of available information needed for cohort assembly (Table 1). During the interviews, ToxStrategies staff members inquired as to the type of information captured in employee records, including personal identifying information and variables that may potentially confound the relationship between occupation and cancer, such as smoking and body mass index (BMI).

**Table 1.** Description of qualitative interviews

| Interviewee          | Position                                                     | Date of Interview |  |  |
|----------------------|--------------------------------------------------------------|-------------------|--|--|
| Luis del Cid         | Fire equipment mechanic                                      | 9/24/2020         |  |  |
| Grant "Sonny" DeRose | Fire equipment mechanic                                      | 9/24/2020         |  |  |
| Harry Wong           | Fire equipment mechanic                                      | 9/24/2020         |  |  |
| Gary Hodge           | President of the AFSCME union local; fire equipment mechanic | 9/29/2020         |  |  |
| Julia Kim            | LA County Fire HR Chief Risk Manager                         | 10/15/2020        |  |  |

After the interviews were completed, ToxStrategies worked with LA County Fire HR to obtain additional information needed for the feasibility study. Notably, the HR department was initially difficult to reach, and responses were often delayed for weeks due to the COVID-19 pandemic. On December 14, 2020, a letter was sent to the department on behalf of ToxStrategies from Assemblywoman Sydney Kamlager's office, one of the co-sponsors of the AB 1400 bill, to encourage response. If an epidemiologic study is pursued, a point person at the County HR will need to be identified to ensure timely response and

participation as the County HR keeps the records necessary to conduct the study for LA County fire mechanics.

#### 4 Results

## 4.1 Exposure Verification

LA County Fire employees are categorized by occupation using job classification codes. During one of ToxStrategies' site visits to LA County Fire, ToxStrategies was provided with a list of job classification codes for employees who would be considered fire mechanics, including equipment maintenance workers, fire equipment mechanics, helicopter mechanics, and helicopter maintenance inspectors (Table 2). Employees working in senior positions for these job titles conduct the same work as non-senior employees but they perform additional supervisory roles. All employees ever holding one of these job classification codes would be considered as part of the fire mechanic cohort.

Table 2. Job classification codes of fire mechanics

| Job Classification Code | Description                         |
|-------------------------|-------------------------------------|
| 6610                    | Equipment Maintenance Worker        |
| 7472                    | Fire Equipment Mechanic             |
| 7492                    | Helicopter Mechanic                 |
| 7496                    | Helicopter Maintenance Inspector    |
| 6613                    | Senior Equipment Maintenance Worker |
| 7473                    | Senior Fire Equipment Mechanic      |
| 7494                    | Senior Helicopter Mechanic          |

The job classification codes are included in various types of county records, including time sheets, personnel files, and union records. Each of these records could serve as a source for identifying participants in the cohort of fire mechanics, as well as determining the length of time employees held a particular position. LA County Fire keeps physical, original copies of official personnel files, as well as electronic records in the eHR system, a county-wide system of electronic personnel records. While personnel records are retained at the County for only five years after an employee's termination (voluntary or involuntary), a listing of employees by job classification code is available through the eHR system, which began in 2012, and the County-Wide Timekeeping and Payroll/Personnel System (CWTAPPS) system, which holds records from 1975 through 2012.

#### 4.2 Outcome Ascertainment

The California Cancer Registry (CCR) is a comprehensive statewide cancer surveillance program that captures diagnoses of cancer in the state of California since 1988. Cancer reporting is required by state law. Approximately 5.8 million cancer cases are available for research in the CCR, and nearly 200,000 additional cases are added annually. The CCR has achieved gold certification from the North American Association of Central Cancer Registries, the highest achievable standard, requiring case ascertainment of ≥95% completeness (California Cancer Registry, 2018).

The LA County Cancer Surveillance Program, which reports data to the CCR, has population-based cancer data available beginning in 1972 (USC, 2020) Cancer cases that occurred in LA County specifically could be traced back to 1972, while cases occurring outside the county could be traced back to 1988.

Cancer mortality can be evaluated using the National Death Index (NDI), a comprehensive database of all deaths occurring in the US from 1979 through 2019 (latest available data). Multiple causes of death are recorded in NDI records, and deaths due to cancer can be identified (CDC, 2021).

Employees at LA County Fire can be linked to the CCR and/or the NDI using their social security number and/or their date of birth, both of which are available in employee official personnel files, as well as through the eHR system. Thus, fire mechanics can be tracked reliably for cancer diagnoses and/or cancer-related death, provided that the cancer was diagnosed within the state of California. Because social security number and date of birth are sensitive personal identifying information, any epidemiologic study would require an ethical evaluation and approval from an institutional review board (IRB). A project proposal would need to be approved by the CCR to receive individual-level data.

#### 4.3 Cohort Enumeration

Using the CWTAPPS system (1975–2012 personnel records), as well as the eHR records (2012–2021), LA County Fire HR was able to provide the number of employees at LA County Fire who held the position of fire mechanic from September 1, 1975, through January 2021 (Table 3). September 1, 1975 was the earliest date available in the CWTAPPS system in order to identify employees holding one of these codes. Senior positions are often promoted internally, such that a single employee can have multiple job codes of interest. After removing duplicate listings of employees holding multiple job codes, a total of 180 individual employees were identified as having one of the fire mechanic classification codes. This is a preliminary estimate; employees holding the position for a short period of time (e.g., <90 days) may not be eligible for inclusion in the cohort.

Table 3. Number of LA County fire mechanics, 1975–2021

| Job Classification Code | Description                                                                                   | Number of Employees |
|-------------------------|-----------------------------------------------------------------------------------------------|---------------------|
| 6610, 6613              | Equipment Maintenance Worker, including promotion to Senior position                          | 20                  |
| 7472, 7473              | Fire Equipment Mechanic, including promotion to Senior position                               | 126                 |
| 7492, 7494, 7496        | Helicopter Mechanic, including promotion to Senior position; Helicopter Maintenance Inspector | 34                  |
|                         | Total                                                                                         | 180                 |

# 4.4 Confounding Variables

Prior to beginning employment at LA County Fire, fire equipment mechanics, equipment maintenance workers, helicopter mechanics and helicopter maintenance inspectors must complete a medical clearance evaluation. Employees undergo a physical evaluation at a separate occupational health clinic. These records are not typically included in employee personnel files, but they could potentially be obtained through the clinic. It is likely that potential confounding variables would be captured during the pre-employment physical, including smoking history, alcohol consumption, BMI, and personal and family medical history.

Confounding variables are also available from linkage with the California Cancer Registry, including tobacco use, comorbidities, patient height and weight, race, and socioeconomic indicators. While some of these variables have been evaluated since the registry's inception in 1988 (comorbidities, race, socioeconomic variables), others are available only for cases diagnosed in 2011 and later (height, weight, tobacco use). Thus, these variables can be used only to validate available data from the pre-employment physical records. Additionally, age, sex, and race may be available using the National Death Index.

# 4.5 Potential Comparison Populations

As a first step, the cancer incidence rates in the fire mechanic cohort could be compared to the age- and sex-standardized cancer incidence and/or mortality rates in the state of California. An incidence rate is calculated by taking the number of newly diagnosed cancer cases over a period of time and dividing by the at-risk population during that time frame. This is usually calculated as a rate per person-time available, such as 10 per 100,000 person-years of cohort follow-up. The ratio of the observed cancer incidence to the expected incidence based on state rates (standardized incidence ratio, or SIR) would identify any differences in cancer rates between fire mechanics and California residents. While these types of studies are useful in identifying potential associations between

occupational groups and cancer, they are often confounded by underlying factors, such as different rates of smoking between the cohort and the general population.

An ideal comparison population to evaluate the risk of cancer in fire mechanics would comprise a demographically similar population. A group of workers with similar distributions of age, sex, race, smoking history, and socioeconomic status would control for potentially confounding variables and isolate the risk factor of working as a fire mechanic. One potential comparison group could be other mechanics in LA County outside of the Fire Department. These employees would likely have demographics similar to those of the fire mechanics, without exposure to firefighting equipment and vehicles. The comparison group could be identified with job classification codes in the eHR system and linked to the CCR. However, it is unclear how many persons would make up a cohort of general mechanics and whether the sample would be large enough to detect statistically significant risks.

#### 4.6 Additional Considerations

A theoretical calculation was conducted to estimate whether the potential cohort size (n=180) would be large enough to detect a significant risk of cancer compared to the general population. The CCR online analysis tool (CAL\*Explorer) was used to determine the incidence rate of all cancers among residents of LA County (386.3 per 100,000). The risk of cancer among fire mechanics was assumed to be the same as the highest risk of a specific cancer site observed among firefighters (50% increased risk of testicular cancer, [IARC 2010], as no summary of the risk of all cancers was available). A power calculation was conducted and determined that approximately 10,000 person-years of time would be required. Assuming an average of 10 years of follow-up (time from beginning occupation as a fire mechanic to latest date cancer data is available), approximately 1000 fire mechanics would be needed to detect a significantly increased risk of cancer.

#### 5 Conclusions and Recommendations

The epidemiologic feasibility study determined that a cohort of fire mechanics in LA County could be assembled, identifying employees holding relevant occupational positions since 1975 and linked to the California Cancer Registry and/or NDI for cancer outcomes. However, the size of the potential cohort would be relatively small (preliminary estimate of 180 employees from 1975–2021), limiting the ability to detect any risk of cancer in this population. Conducting an epidemiologic study in this potential cohort would not produce meaningful results. If the cancer risk in fire mechanics was similar to that of firefighters, at least 1000 fire mechanics would be needed to determine a significant increased risk of cancer.

#### 5.1 Recommendation

Evaluate potential of expanding the cohort to fire mechanics throughout the state of California.

The cohort of fire mechanics could be reliably constructed using job classification codes and personnel records in LA County and could be tracked for cancer outcomes using the CCR and/or NDI. To increase statistical power and precision, the feasibility of expanding the cohort to fire mechanics throughout California could be explored. If other counties use the same personnel records system and job classification codes, including all fire mechanics in the State of California in the cohort, it would be straightforward. Cancer incidence and mortality rates could be calculated for the cohort and compared to rates in LA County and the State of California after standardizing the rates by age, sex, and race. A larger cohort size would increase the statistical ability to detect any significant cancer risk in these workers. Further, if an increased risk of one or more cancer sites is detected within the cohort, nested case-control studies can be conducted to evaluate specific risk factors within the cohort for these cancer types (e.g., certain job tasks, exposures, or demographic factors).

#### 6 References

AB 1400 Employment safety: Firefighting equipment: Mechanics (2019–2020). In. Senate Committee on Labor, Public Employment and Retirement, 2019.

CAL\*Explorer. 2020. An interactive website for California Cancer Registry (CCR) cancer statistics. California Department of Public Health.

California Cancer Registry. 2018. Learn About CCR. ccrcal.org/learn-about-ccr/. Accessed 2021.

CDC (Centers for Disease Control and Prevention). 2021. About the National Death Index. https://www.cdc.gov/nchs/ndi/about.htm.

IARC (International Agency for Research on Cancer) Working Group on the Evaluation of Carcinogenic Risks to Humans. Painting, firefighting, and shiftwork. 2010. IARC Monogr Eval Carcinog Risks Hum 98:9–764.

Labor Code. 2019. Employment safety: Firefighting equipment: Mechanics.

LeMasters GK, Genaidy AM, Succop P, et al. 2006. Cancer risk among firefighters: A review and meta-analysis of 32 studies. J Occup Environ Med 48(11):1189–1202.

National Cancer Institute: Surveillance, Epidemiology, and End Results Program. 2021. Cancer Stat Facts: Cancer of Any Site. https://seer.cancer.gov/statfacts/html/all.html

Tsai RJ, Luckhaupt SE, Schumacher P, Cress RD, Deapen DM, Calvert GM. 2015. Risk of cancer among firefighters in California, 1988–2007. Am J Indust Med 58(7):715–729.

USC (University of Southern California). 2020. Los Angeles County Cancer Surveillance Program. https://csp.usc.edu/about/.

#### **APPENDIX D**

# Task 4: Quantitative Exposure Assessment

# Task 4: Quantitative Exposure Assessment

**FEBRUARY 25, 2021** 

## Tox Strategies

Innovative solutions
Sound science

# Task 4: Quantitative Exposure Assessment

**FEBRUARY 25, 2021** 

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#### **Acronyms**

AB Assembly Bill (California)

AIHA American Industrial Hygiene Association

BA breathing apparatus

CalOSHA California Occupational Safety and Health Administration
CHSWC Commission on Health and Safety and Workers' Compensation

cm centimeter

Cr(VI) hexavalent chromium DI deionized (water)

DIR California Department of Industrial Relations

DOSH California Division of Occupational Safety and Health

FEM Fire Equipment Mechanic

GC/HRMS gas chromatography / high-resolution mass spectrometry

ID identifier

μg/cm<sup>2</sup> micrograms per square centimeter

um micrometer

mg/m<sup>3</sup> milligrams per cubic meter of air

mm millimeter Mod. modified

NaOHqz sodium hydroxide—coated binderless quartz (fiber filter wipe)

NIOSH National Institute for Occupational Safety and Health

OCP organochlorine pesticide

OSHA Occupational Safety and Health Administration

PAH polycyclic aromatic hydrocarbon PBZ personal breathing-zone (air samples)

PCB polychlorinated biphenyl
PEL permissible exposure limit
PPE personal protective equipment
ppm parts per million by volume

PVC polyvinyl chloride SEG similar exposure group

TCDD 2,3,7,8-tetrachlorodibenzo-*p*-dioxin

TEF toxicity equivalency factor

TEQ toxic equivalence
TWA time-weighted average

#### 1 Background

ToxStrategies was contracted by the California Department of Industrial Relations (DIR), Commission on Health and Safety and Workers' Compensation (CHSWC), to conduct the study as outlined in California Assembly Bill (AB) 1400. AB 1400 was created to define the fire mechanics' risk of exposures to carcinogens in the course of employment.

The study components include:

- Site visits to representative facilities in Los Angeles County, California
- Interviews and surveys with current and former fire mechanics
- Feasibility study to assess cancer incidence among fire mechanics
- Occupational exposure measurements of carcinogens found in the workplace, to evaluate potential exposure to carcinogenic materials
- Quantitative health risk assessment of potential increased cancer risk associated with exposure to carcinogens in the workplace.

ToxStrategies' approach to address these study components includes six tasks (provided in our proposal submitted to the DIR [ToxStrategies, Inc., 2020a]):

- Task 1: Structured literature review submitted; ToxStrategies, Inc. (2020b)
- Task 2: Qualitative exposure assessment submitted; ToxStrategies, Inc. (2020c)
- Task 3: Epidemiologic assessment feasibility study of cohort enumeration for future epidemiologic study design ongoing
- Task 4: Quantitative exposure assessment measurement of current occupational exposures to carcinogens; provided herein
- Task 5: Cancer risk assessment calculation of theoretical excess cancer risks from occupational exposure to carcinogens
- Task 6: Technical assistance to the DIR.

The purpose of Task 4, Quantitative Exposure Assessment, was to conduct exposure monitoring of workers for airborne chemicals, as well as chemical analysis of surface residues, based on the findings from Tasks 1 and 2. Samples from each similar exposure group (SEG) were selected for personal breathing-zone (PBZ) air sampling and surface wipe sampling of equipment. The quantitative exposure results from Task 4 will be used subsequently in the cancer risk assessment (Task 5). The objectives, methods, results, and conclusions of Task 4 are provided herein. The remaining study tasks are described in Section 7.

#### 2 Objectives

The objectives of this quantitative exposure assessment were as follows:

- 1. Prepare a quantitative exposure assessment work plan.
- 2. Collect PBZ air samples and surface wipe samples for analysis at an American Industrial Hygiene Association (AIHA)-accredited laboratory.
- 3. Present the analytical sample results (measurements) for each of the prioritized job tasks.

### 3 Methods of Selecting Carcinogens

The identification and selection of chemicals for analytical sampling, for each of the prioritized job tasks, included the evaluation of findings from Task 1, Task 2, and other sources, as summarized below.

#### 3.1 Task 1 Findings

ToxStrategies identified chemicals in Task 1 (Structured Literature Review; ToxStrategies, Inc., 2020b) for consideration in the quantitative exposure assessment, and additional chemicals were added to the analysis plan following Task 2 (Qualitative Exposure Assessment). In Task 1, ToxStrategies found no occupational chemical exposure studies that explicitly focused on fire mechanics. However, nine industrial hygiene studies presented data for fire stations and firefighting vehicles and/or gear, which could overlap with occupational exposures of fire mechanics. The chemical carcinogens evaluated in those studies, or considered subsequently for inclusion, are benzene, diesel exhaust, polycyclic aromatic hydrocarbons (PAHs), crystalline silica, ethylbenzene, polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), acetaldehyde, formaldehyde, 1,4-dichlorobenzene, and styrene. Benzene, diesel exhaust, PAHs, crystalline silica, and ethylbenzene were identified in Task 2 for inclusion in the quantitative assessment. OCPs and 1,4-dichlorobenzene were not included in the analyses for Task 4, for the following reasons:

- OCPs were excluded from incorporation into the sampling plan, based on the results of the study by Park et al. (2015) and the findings presented in IARC (2010). Park et al. found that firefighting was not a significant source of exposure to OCPs. Further, IARC did not report OCPs in their list of chemicals measured during various firefighting operations (wildland, municipal, training, or arson investigation).
- 1,4-Dichlorobenzene was excluded from consideration in the sampling plan, because Fent et al. (2015) reported that firefighters' brand new personal protective equipment (PPE) had a higher measured off-gassing air concentration of 1,4-dichlorobenzene than that of the used PPE that had been exposed to a controlled burn. Therefore, off-gassing of 1,4-dichlorobenzene was not associ-

ated with the burn, but presumably, was associated with the chemicals used in manufacturing the PPE.

PCBs, styrene, acetaldehyde, and formaldehyde were included in the Task 4 investigation, for the following reasons:

- PCBs were not found to be a significant source of exposure among firefighters, when measured in firefighter serum in the study by Park et al. (2015). However, IARC (2010) reported PCBs in their list of chemicals measured during municipal firefighting operations. Therefore, PCBs were included in the sampling plan for surface wipe analysis.
- Styrene was reported to have higher measured off-gassing in used firefighters' PPE that had been exposed to a controlled burn than the measured background levels (Fent et al., 2015). Therefore, styrene was added to the air sampling plan for the SEG of equipment maintenance workers.
- Acetaldehyde and formaldehyde were measured at low levels during wildland firefighting by Materna et al. (1992); therefore, these aldehydes were both included in the PBZ air sampling plan for the SEG of equipment maintenance workers.

#### 3.2 Task 2 Findings

ToxStrategies relied primarily on the findings from Task 2, Qualitative Exposure Assessment (ToxStrategies, Inc., 2020c), to prioritize the chemicals included in the PBZ air samples and surface wipe samples. A qualitative exposure assessment tool was used to rank potential exposures associated with jobs and tasks to carcinogens identified in the workplace. This tool allowed ToxStrategies to target the DIR resources for Task 4 most cost-effectively. Based on the outcome of the risk ranking results for all four SEGs, ToxStrategies prioritized the job tasks listed in Table 1 for the quantitative exposure assessment.

ToxStrategies identified the surface residue, soot, as a priority carcinogen to measure during the quantitative exposure assessment. Soot, ash, and char are considered fire residues and have the potential to pose an occupational exposure concern for fire mechanics who frequently contact fire apparatuses and equipment that have been exposed to a fire. The chemicals that make up this residue may include "heavy metals, PAHs, dioxins and furans" (AIHA, 2018). PAHs, dioxins, and furans were thus added to the sampling plan for surface sampling of fire residues. With regard to the heavy metals, ToxStrategies included arsenic and lead, because both have published cancer potency measures for the oral route, which can be evaluated for cancer risk through a surface wipe sample. ToxStrategies excluded cadmium, beryllium, nickel, and cobalt from the surface wipe sampling plan, because these chemicals are carcinogenic only by inhalation and do not have published cancer potency measures for other routes of exposure. Therefore, they were not evaluated in surface wipe samples.

Table 1. Job tasks prioritized for the quantitative exposure assessment

| Job Task                                                             | Similar Exposure Group                | Location                                                            |
|----------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------|
| Heavy maintenance on aircraft, including the task of oil leak checks | Helicopter mechanic                   | Air Operations, Pacoima                                             |
| Intermediate maintenance on aircraft                                 | Helicopter mechanic                   | Air Operations, Pacoima                                             |
| Painting/priming/sanding aircraft parts                              | Helicopter maintenance inspector      | Air Operations, Pacoima                                             |
| Repair and tune-up of power equipment and rescue tools               | Equipment maintenance worker          | Breathing Apparatus Shop, Pacoima                                   |
| Fire hose repair                                                     | Equipment maintenance worker          | Breathing Apparatus Shop, Pacoima                                   |
| Maintenance and repair on fire apparatus                             | Shop-assigned fire equipment mechanic | Eastern Fire Shop, Los Angeles, & North County Fire Shop, Lancaster |
| Repair of fire apparatus or other equipment at a wildfire base camp  | Field-assigned FEM                    | Wildfire base camp                                                  |

#### 3.3 Other Findings

A recent study by Fent et al. (2020) reported detections of the carcinogenic flame retardant, tetrabromobisphenol-A, and chlorinated and brominated dioxins/furans in wipe samples of firefighters' PPE subsequent to exposure to a simulated residential fire. Tetrabromobisphenol-A and chlorinated and brominated dioxins/furans were also detected in air samples collected during the active fire period of the simulated residential fire. Because tetrabromobisphenol-A does not have published cancer potency measures, it cannot be evaluated quantitatively, and therefore, it was not included in the sampling plan for wipe analysis. However, chlorinated dioxins and furans were added to the sampling plan for wipe analysis for all five SEGs based on the findings of this study.

ToxStrategies added the carcinogen pentachlorophenol to the sampling plan based on the data reported in IARC (2010). Pentachlorophenol was detected in air samples measured in municipal fires; thus, this chemical was suspected to be a fire residue in fire equipment and apparatuses. Therefore, pentachlorophenol was added to the sampling plan for wipe analysis for the SEGs of fire equipment mechanic and equipment maintenance workers.

### 4 Sampling Plan

The final sampling plan is summarized below for each SEG and job task (Table 2). Execution of the sampling plan for each job task is described in more detail below.

Table 2. Quantitative assessment plan by SEG and job task

|                                                                               | Job Task Description                                                 | Job Title                                                   | Exposure Media                                                                                                                                                         | a and Chemicals                                                                                                                        |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Site Location                                                                 | Job Task Name                                                        | SEG                                                         | Air                                                                                                                                                                    | Surface Residue                                                                                                                        |
| Air Operations,<br>Pacoima                                                    | Heavy maintenance on aircraft, including the task of oil-leak checks | Helicopter Mechanic/<br>Helicopter Maintenance<br>Inspector | Crystalline silica,<br>Cr(VI)                                                                                                                                          | Cr(VI), PAHs, arsenic, lead                                                                                                            |
| Air Operations,<br>Pacoima                                                    | Intermediate maintenance on aircraft                                 | Helicopter Mechanic/<br>Helicopter Maintenance<br>Inspector | Benzene, ethylbenzene, naphthalene, Cr(VI)                                                                                                                             | Cr(VI), chlorinated<br>dioxins/furans, PCBs,<br>PAHs, arsenic, lead                                                                    |
| Air Operations,<br>Pacoima                                                    | Painting/priming/sanding aircraft parts                              | Helicopter Mechanic/<br>Helicopter Maintenance<br>Inspector | Ethylbenzene, Cr(VI),<br>4-chlorobenzo-<br>trifluoride, methylene<br>chloride                                                                                          |                                                                                                                                        |
| Breathing<br>Apparatus Shop,<br>Pacoima                                       | Repair and tune-up of power equipment and rescue tools               | Equipment Maintenance<br>Worker                             | Acetaldehyde,<br>formaldehyde, benzene,<br>ethylbenzene,<br>naphthalene, styrene                                                                                       | PAHs, chlorinated<br>dioxins/furans, PCBs,<br>pentachlorophenol,<br>arsenic, lead                                                      |
| Breathing<br>Apparatus Shop,<br>Pacoima                                       | Fire hose repair                                                     | Equipment Maintenance<br>Worker                             |                                                                                                                                                                        | PAHs, arsenic, lead                                                                                                                    |
| Eastern Fire<br>Shop, Los<br>Angeles; North<br>County Fire<br>Shop, Lancaster | Maintenance and repair on fire apparatus                             | Shop/Field Fire Equipment<br>Mechanic                       | Benzene, ethylbenzene<br>naphthalene, diesel<br>particulate, N,N-<br>dimethyl-para-<br>toluidine,<br>tetrachloroethylene,<br>welding fume metals<br>(including Cr(VI)) | PAHs, chlorinated<br>dioxins/furans, PCBs,<br>pentachlorophenol,<br>arsenic, lead, bulk<br>sample of fiberglass<br>strips for asbestos |
| Wildfire base camp or fire site                                               | Repair of fire apparatus or other equipment                          | Field Fire Equipment<br>Mechanic                            | Acetaldehyde, benzene,<br>ethylbenzene,<br>naphthalene, diesel<br>particulate,<br>formaldehyde, PAHs                                                                   | PAHs, chlorinated<br>dioxins/furans, PCBs,<br>pentachlorophenol,<br>arsenic, lead                                                      |

Abbreviations: Cr(VI) = hexavalent chromium; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls

#### 4.1 Air Operations, Pacoima

#### 4.1.1 Heavy maintenance on aircraft, including the task of oil-leak checks

Heavy maintenance on the aircraft by helicopter mechanics typically takes place inside the hangar, and includes disassembling and reassembling airframes, engines, and other components and parts. The mechanics generally wear a uniform, work boots, goggles/safety glasses, hearing protection, gloves (type dependent on task), and knee pads.

Personal breathing zone air samples were collected from six helicopter mechanics and analyzed for the following chemicals:

- Crystalline silica by NIOSH 7500 (modified [Mod.]) and 0600 using a 5-μm (micrometer) polyvinyl chloride (PVC) membrane and tared 5-μm PVC membrane in a three-piece cassette with aluminum cyclone
- Hexavalent chromium by OSHA ID-215 (version 2) using a 5-μm PVC membrane in a 37-mm (millimeter) cassette.

Wipe samples of the helicopter surfaces were collected in accordance with NIOSH Method 9100 (NIOSH, 1996) using a 10- x 10-centimeter (cm) square template. One template and a new pair of gloves were used for each wipe sample. Six surfaces were sampled for the following chemicals:

- PAHs by NIOSH 5528 using hexane-extracted gauze
- Arsenic and lead by NIOSH 9102 Mod. using Ghost Wipes.

Two surfaces were sampled for hexavalent chromium by OSHA ID-215 using a 37-mm sodium hydroxide—coated binderless quartz (NaOHqz) fiber filter wipe.

The chemicals, sample identifiers (IDs), sampling locations, and observations/notes are summarized in Table 3 for the wipe samples collected on various surfaces of the aircrafts stationed in the hangar for heavy maintenance on November 3, 2020.

Table 3. Wipe samples collected on aircrafts in hangar

| Chemicals | Sample ID | Sampling Location                 | Observations /<br>Notes |
|-----------|-----------|-----------------------------------|-------------------------|
| PAHs      | N190LA-01 | Intermediate gear box of Firehawk | Fire residues/ dust     |
| PAHs      | N14LA-03  | Right stabilator of<br>Bell412    | Fire residues/ dust     |
| PAHs      | N14LA-02  | Right tailbone of<br>Bell412      | Fire residues/ dust     |

| Chemicals           | Sample ID   | Sampling Location                                        | Observations /<br>Notes |
|---------------------|-------------|----------------------------------------------------------|-------------------------|
| PAHs                | N14LA-01    | Right side of nose of<br>Bell412                         | Fire residues/ dust     |
| PAHs                | N190LA-02   | Upper aft blade antenna, left side, of Firehawk          | Fire residues/ dust     |
| PAHs                | N190LA-03   | Transition access door, underside, of Firehawk           | Fire residues/ dust     |
| Arsenic and lead    | N190LA-01-A | Intermediate gear box of Firehawk                        | Fire residues/ dust     |
| Arsenic and lead    | N190LA-02-A | Upper aft blade antenna, left side, of Firehawk          | Fire residues/ dust     |
| Arsenic and lead    | N14LA-02-A  | Right tailbone of Bell412                                | Fire residues/ dust     |
| Arsenic and lead    | N14LA-01-A  | Right side of nose of Bell412                            | Fire residues/ dust     |
| Arsenic and lead    | N190LA-03-A | Transition access door, underside, of Firehawk           | Fire residues/ dust     |
| Arsenic and lead    | N14LA-03-A  | Right stabilator of<br>Bell412                           | Fire residues/ dust     |
| Hexavalent chromium | N14LA-05    | Skid on right side of<br>Bell412                         | Mastinox visible        |
| Hexavalent chromium | N14LA-06    | Mating surface of combining gear box trimount of Bell412 | Mastinox visible        |

One field blank per analyte was collected for quality assurance.

#### 4.1.2 Intermediate maintenance on aircraft

Intermediate maintenance includes routine daily inspection and maintenance on the aircraft by helicopter mechanics. This task is approximately an hour in duration and typically takes place outdoors on the flight line or in a covered area off the flight line. PPE includes work boots, work uniform, goggles/safety glasses, hearing protection, gloves (depending on task), and knee pads. Intermediate maintenance is performed at the start of the work shift. After the intermediate maintenance is completed each day, the helicopter mechanics return to the hangar and conduct heavy maintenance on the aircraft. The intermediate maintenance helicopter mechanics were measured during their entire work shift; therefore, the occupa-

tional exposure samples capture both intermediate maintenance and heavy maintenance on the aircraft, with the latter task constituting the bulk of the measurements.

PBZ air sampling was measured among six helicopter mechanics for the following chemicals:

- Benzene, ethylbenzene, and naphthalene using a 3M 3500/3520 organic vapor monitor
- Hexavalent chromium by OSHA ID-215 (version 2) using a 5-μm PVC membrane in a 37-mm cassette.

Wipe samples of the helicopter surfaces were collected in accordance with NIOSH Method 9100 (NIOSH, 1996) using a 10- x 10-cm square template. One template and a new pair of gloves were used for each wipe sample.

Six surfaces were sampled for the following chemicals:

- Polycyclic aromatic hydrocarbons (PAHs) by NIOSH 5528 using hexaneextracted gauze
- Arsenic and lead by NIOSH 9102 Mod. using Ghost Wipes
- Hexavalent chromium by OSHA ID-215 using a 37-mm NaOHqz fiber filter.

Two surfaces were sampled for the following chemicals:

• Chlorinated dioxins/furans by EPA 1613B and PCBs by EPA 1668C using swabs soaked in hexane.

The chemicals, sample IDs, sampling locations, and observations/notes are summarized in Table 4 for the wipe samples collected on various surfaces of the aircrafts parked on the flight line for intermediate maintenance on November 3, 2020.

 Table 4.
 Wipe samples collected on aircraft on the flight line

| Chemical               | Sample ID       | Sampling Location                           | Observations/ Notes                                   |
|------------------------|-----------------|---------------------------------------------|-------------------------------------------------------|
| PAHs                   | N822LA-01       | Right engine exhaust cowling of Firehawk    | Firehawk had been to a recent wildfire (October 2020) |
| PAHs                   | N120LA-01       | Tail of Bell412                             | Bell412 had not been cleaned since usage in wildfire  |
| PAHs                   | N120LA-02       | Blade antenna of Bell412                    | Bell412 had not been cleaned since usage in wildfire  |
| PAHs                   | N822LA-03       | Horizontal stabilator of Firehawk           | Firehawk had been to a recent wildfire (October 2020) |
| PAHs                   | N822LA-02       | Forward cowling, right side, of Firehawk    | Firehawk had been to a recent wildfire (October 2020) |
| PAHs                   | N120LA-03       | Glass "sun roof"/"greenhouse"<br>of Bell412 | Bell412 had not been cleaned since usage in wildfire  |
| Arsenic and lead       | N120LA-03-<br>A | Glass "sun roof"/"greenhouse"<br>of Bell412 | Bell412 had not been cleaned since usage in wildfire  |
| Arsenic and lead       | N822LA-03-<br>A | Horizontal stabilator of Firehawk           | Firehawk had been to a recent wildfire (October 2020) |
| Arsenic and lead       | N120LA-01-<br>A | Tail of Bell412                             | Bell412 had not been cleaned since usage in wildfire  |
| Arsenic and lead       | N120LA-02-<br>A | Blade antenna of Bell412                    | Bell412 had not been cleaned since usage in wildfire  |
| Arsenic and lead       | N822LA-01-<br>A | Right engine exhaust cowling of Firehawk    | Firehawk had been to a recent wildfire (October 2020) |
| Arsenic and lead       | N822LA-02-<br>A | Forward cowling, right side, of Firehawk    | Firehawk had been to a recent wildfire (October 2020) |
| Hexavalent<br>Chromium | N18LA-01        | Hot part of left engine (seam) of Bell412   |                                                       |
| Hexavalent<br>Chromium | N17LA-04        | Hot part of left engine (seam) of Bell412   |                                                       |
| Hexavalent<br>Chromium | N18LA-02        | Hot part of right engine (seam) of Bell412  |                                                       |
| Hexavalent<br>Chromium | N120LA-01       | Hot part of right engine (seam) of Bell412  |                                                       |

| Chemical                           | Sample ID | Sampling Location                         | Observations/ Notes |
|------------------------------------|-----------|-------------------------------------------|---------------------|
| Hexavalent<br>Chromium             | N120LA-02 | Hot part of left engine (seam) of Bell412 |                     |
| Hexavalent<br>Chromium             | N17LA-03  | Hot part of left engine (seam) of Bell412 |                     |
| Chlorinated dioxins/ furans & PCBs | 356-4     | Horizontal stabilator of<br>Bell412       |                     |
| Chlorinated dioxins/ furans & PCBs | 356-5     | Chin bubble of Bell412                    |                     |

Field blanks were collected for quality assurance, as applicable.

Although diethanolamine and tetrahydrofuran were also considered potential carcinogens of concern for this job task, these compounds were not measured quantitatively, because they do not have published cancer potency measures. Thus, the cancer risk assessments conducted in Task 5 for these chemicals will be qualitative.

#### 4.1.3 Painting/priming/sanding aircraft parts

For the helicopter maintenance inspector job task of painting/priming on the interior and exterior of the aircraft, sanding helicopter blades, painting helicopter blades, and painting using aerosol paints and epoxy primers, ToxStrategies planned to measure one helicopter maintenance inspector for the following chemicals through PBZ air sampling:

- Ethylbenzene using a 3M 3500/3520 organic vapor monitor
- Hexavalent chromium by OSHA ID-215 (version 2) using a 5-μm PVC membrane in a 37-mm cassette
- Methylene chloride using a 3M 3520 two-stage organic vapor monitor
- 4-Chlorobenzotrifluoride by NIOSH 1026 using a coconut shell charcoal sorbent tube.

However, ToxStrategies was informed by Air Operations shortly before the scheduled sampling event that this job task would not be performed and therefore could not be measured, because no paint jobs were needed at the time. Therefore, the cancer risk assessment (Task 5) for these chemicals in this job task will be qualitative.

#### 4.1.4 Area samples

ToxStrategies collected two area PBZ air samples to be analyzed for the following chemicals:

 Benzene, ethylbenzene, and naphthalene using a 3M 3500/3520 organic vapor monitor.

Because a field blank had already been collected for each of these chemicals, no additional field blanks were collected.

#### 4.2 Breathing Apparatus Shop, Pacoima

#### 4.2.1 Repair and tune-up of power equipment and rescue tools

Shop locations at Pacoima include the Breathing Apparatus (BA) Shop, Small Engine Repair Shop, and Fire Hose Repair Shop. At the Small Engine Repair Shop, worker tasks include equipment examination and analysis of equipment malfunctions or mechanical failure. Other tasks include tuning up equipment used by the County fire stations, such as rescue tools, lawn mowers, vacuums, and generators. At the Fire Hose Repair Shop, the workers are responsible for repairing fire-truck hoses and completing the hose test. Equipment, such as firefighter BAs, is maintained and tested at the Pacoima BA Shop. BAs used during fire training in simulated structure burns, such as that conducted at the Los Angeles County Fire Department Fire Station 129 in Lancaster, are maintained at the BA Pacoima shop. The workers' PPE includes latex gloves and an apron.

At the Engine Repair Shop, PBZ air samples were collected among two equipment maintenance workers for the following chemicals:

- Benzene, ethylbenzene, naphthalene, and styrene using a 3M 3500/3520 organic vapor monitor
- Acetaldehyde and formaldehyde by EPA TO-11A using an SKC 500-100, UMEx 100 passive sampler.

Wipe samples of the air packs (exterior surfaces) were collected in accordance with NIOSH Method 9100 (NIOSH, 1996) using a 10- x 10-cm square template. One template and a new pair of gloves were used for each wipe sample. Six air packs were sampled for the following chemicals:

- PAHs by NIOSH 5528 using hexane-extracted gauze
- Arsenic and lead by NIOSH 9102 Mod. using Ghost Wipes.

Two air packs (exterior surfaces) were sampled for the following chemicals:

• Chlorinated dioxins/furans by EPA 1613B and PCBs by EPA 1668C using swabs soaked in hexane.

• Pentachlorophenol by OSHA 39 using sterile cotton gauze soaked in deionized (DI) water.

The chemicals, sample IDs, sampling locations, and observations/notes are summarized in Table 5 for the wipe samples collected on the field and training air packs in the BA shop on November 3, 2020.

Table 5. Wipe samples collected on air packs

| Chemical                           | Sample ID          | Sampling Location                      | Observations/ Notes                |
|------------------------------------|--------------------|----------------------------------------|------------------------------------|
| PAHs                               | A49996             | Where air pump sits, northern location | Field air pack                     |
| PAHs                               | A50421 ENG-21-4    | Where air pump sits, northern location | Field air pack                     |
| PAHs                               | A5014 Q-24-5       | Where air pump sits, northern location | Field air pack                     |
| PAHs                               | ECTC-T-8           | Where air pump sits, northern location | Training air pack                  |
| PAHs                               | ECTC-T-38          | Where air pump sits, northern location | Training air pack                  |
| PAHs                               | NCSO-04            | Where air pump sits, northern location | Training air pack                  |
| Arsenic and lead                   | ECTC-T-8-A         | Where pump sits, southern location     | Training air pack                  |
| Arsenic and lead                   | ECTC-T-38-A        | Where pump sits, southern location     | Training air pack                  |
| Arsenic and lead                   | A49996-QUT-185-4-A | Where pump sits, southern location     | Field air pack                     |
| Arsenic and lead                   | A50143-Q-24-5-A    | Where pump sits, southern location     | Field air pack                     |
| Arsenic and lead                   | NC50-4-A           | Where pump sits, southern location     | Training air pack                  |
| Arsenic and lead                   | AS0421-ENG-21-4-A  | Where pump sits, southern location     | Field air pack                     |
| Chlorinated dioxins/ furans & PCBs | BA-1               | Where pump sits, middle portion        | Field air pack;<br>AS0421-Eng-21-4 |

| Chemical                           | Sample ID     | Sampling Location               | Observations/ Notes             |
|------------------------------------|---------------|---------------------------------|---------------------------------|
| Chlorinated dioxins/ furans & PCBs | BA-2          | Where pump sits, middle portion | Training air pack;<br>ECTC-T-42 |
| Pentachlorophenol                  | A50143-Q-24-5 | Where pump sits, middle portion | Field air pack                  |
| Pentachlorophenol                  | ECTC-T-7      | Where pump sits, middle portion | Training air pack               |

Field blanks were collected for quality assurance, as applicable.

#### 4.2.2 Fire hose repair

Wipe samples of used fire hoses (exterior surfaces) were collected in accordance with NIOSH Method 9100 (NIOSH, 1996) using a 10- x 10-cm square template. One template and a new pair of gloves were used for each wipe sample. Six fire hoses were sampled for the following chemicals:

- PAHs by NIOSH 5528 using hexane-extracted gauze
- Arsenic and lead by NIOSH 9102 Mod. using Ghost Wipes.

The chemicals, sample IDs, sampling locations, and observations/notes are summarized in Table 6 for the wipe samples collected on the fire hoses on November 3, 2020.

Table 6. Wipe samples collected on fire hoses

| Chemical         | Sample ID | Sampling Location | Observations/ Notes   |
|------------------|-----------|-------------------|-----------------------|
| PAHs             | H-01      | Exterior of hose  | Fire hose, very dirty |
| PAHs             | H-02      | Exterior of hose  | Fire hose             |
| PAHs             | H-03      | Exterior of hose  | Fire hose             |
| PAHs             | H-04      | Exterior of hose  | Fire hose, very dirty |
| PAHs             | H-05      | Exterior of hose  | Fire hose, very dirty |
| PAHs             | H-06      | Exterior of hose  | Fire hose             |
| Arsenic and lead | H-01-A    | Exterior of hose  | Fire hose             |
| Arsenic and lead | H-02-A    | Exterior of hose  | Fire hose             |
| Arsenic and lead | H-03-A    | Exterior of hose  | Fire hose             |

| Chemical         | Sample ID | Sampling Location | Observations/ Notes |
|------------------|-----------|-------------------|---------------------|
| Arsenic and lead | H-04-A    | Exterior of hose  | Fire hose           |
| Arsenic and lead | H-05-A    | Exterior of hose  | Fire hose           |
| Arsenic and lead | H-06-A    | Exterior of hose  | Fire hose           |

Field blanks were collected for quality assurance, as applicable.

#### 4.3 Eastern Fire Shop, Los Angeles

#### 4.3.1 Maintenance and repair on fire apparatus

Shop-assigned Fire Equipment Mechanics (FEMs) typically work on the major repairs such as engine and transmission changes, in-frame engine rebuilds, differential exchanges and rebuilds, major pump repair, plumbing issues, and water tank removal, and they are required to do more welding for significant parts repair and replacement. PPE among the FEMs varies depending on task. For example, during welding, PPE includes a welding helmet, welding gloves, and an N95 respirator; when painting, PPE includes latex gloves, eye protection, and an N95 respirator. Goggles (or other eye protection), latex gloves, and knee pads are used for other FEM tasks.

PBZ air samples were collected among six FEMs for the following chemicals:

- Benzene, ethylbenzene, and naphthalene using a 3M 3500/3520 organic vapor monitor
- Diesel particulate (as elemental carbon) by NIOSH 5040 using a quartz-fiber filter in a three-piece 37-mm cassette
- Welding fume metals by NIOSH 7300 Mod. using 0.8-μm mixed cellulose ester membrane in a two-piece 37-mm cassette
- Hexavalent chromium (in welding fume) by OSHA ID-215 (version 2) using a 5-μm PVC membrane in a 37-mm cassette
- N,N-Dimethyl-para-toluidine by NIOSH 2002 (Issue 2) using an SKC 226-98, XAD-7 (phosphoric acid) sorbent tube
- Tetrachloroethylene by NIOSH 1003 using an SKC 226-01, charcoal tube (100/50 mg).

Wipe samples on the fire trucks were collected in accordance with NIOSH Method 9100 (NIOSH, 1996) using a 10- x 10-cm square template. One template and a new pair of gloves were used for each wipe sample. Six locations on the fire truck were sampled for the following chemicals:

- PAHs by NIOSH 5528 using hexane-extracted gauze
- Arsenic and lead by NIOSH 9102 Mod. using Ghost Wipes
- Pentachlorophenol by OSHA 39 using sterile cotton gauze soaked in DI water
- Chlorinated dioxins/furans by EPA 1613B and PCBs by EPA 1668C using swabs soaked in hexane.

The chemicals, sample IDs, sampling locations, and observations/notes are summarized in Table 7 for the wipe samples collected on various surfaces of the fire trucks at the Eastern Fire Shop on November 4, 2020.

Table 7. Wipe sample collected on fire trucks

| Chemical                           | Sample ID      | Sampling Location                                               | Observations/ Notes                                                  |
|------------------------------------|----------------|-----------------------------------------------------------------|----------------------------------------------------------------------|
| PAHs                               | ENG-558-PAH-01 | Under captain's chair                                           | Engine 558; 1998;<br>F0561; very dusty                               |
| PAHs                               | ENG-159-PAH-01 | Plumbing compartment                                            | Engine 159; F2174; very dirty on piping                              |
| PAHs                               | ENG-583-PAH-02 | Truck bed where the hoses sit                                   | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; some ashy debris |
| PAHs                               | ENG-583-PAH-01 | Left rear frame at differential                                 | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; very dirty       |
| PAHs                               | ENG-558-PAH-02 | Foam pump compartment                                           | Engine 558; 1998; F0561; dusty/dirty                                 |
| PAHs                               | ENG-168-PAH-01 | Fuel cell directly beneath<br>the stainless-steel water<br>tank | Engine 168; F1567;<br>dusty/dirty                                    |
| Chlorinated dioxins/ furans & PCBs | ENG-558-DFP-02 | Foam pump compartment                                           | Engine 558; 1998;<br>F0561; dusty/dirty                              |
| Chlorinated dioxins/ furans & PCBs | ENG-583-DFP-02 | Truck bed where the hoses sit                                   | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; some ashy debris |
| Chlorinated dioxins/ furans & PCBs | ENG-168-DFP-01 | Fuel cell directly beneath<br>the stainless-steel water<br>tank | Engine 168; F1567;<br>dusty/dirty                                    |
| Chlorinated dioxins/ furans & PCBs | ENG-159-DFP-1  | Plumbing compartment                                            | Engine 159; F2174; very dirty on piping                              |

| Chemical                           | Sample ID        | Sampling Location                                               | Observations/ Notes                                                  |  |
|------------------------------------|------------------|-----------------------------------------------------------------|----------------------------------------------------------------------|--|
| Chlorinated dioxins/ furans & PCBs | ENG-583-DFP-01   | Left rear frame at differential                                 | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; very dirty       |  |
| Chlorinated dioxins/ furans & PCBs | ENG-558-DFP-01   | Under captain's chair                                           | Engine 558; 1998;<br>F0561; very dusty                               |  |
| Pentachlorophenol                  | ENG-168-PENTA-01 | Fuel cell directly beneath<br>the stainless-steel water<br>tank | Engine 168; F1567;<br>dusty/dirty                                    |  |
| Pentachlorophenol                  | ENG-583-PENTA-01 | Left rear frame at differential                                 | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; very dirty       |  |
| Pentachlorophenol                  | ENG-558-PENTA-01 | Under captain's chair                                           | Engine 558; 1998;<br>F0561; very dusty                               |  |
| Pentachlorophenol                  | ENG-583-PENTA-02 | Truck bed where the hoses sit                                   | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; some ashy debris |  |
| Pentachlorophenol                  | ENG159-PENTA-1   | Plumbing compartment                                            | Engine 159; F2174; very dirty on piping                              |  |
| Pentachlorophenol                  | ENG-558-PENTA-02 | Foam pump compartment                                           | Engine 558; 1998;<br>F0561; dusty/dirty                              |  |
| Arsenic and lead                   | ENG583-A-1       | Left rear frame at differential                                 | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; very dirty       |  |
| Arsenic and lead                   | ENG-558-A-01     | Captain's kick panel                                            | Engine 558; 1998;<br>F0561; very dusty                               |  |
| Arsenic and lead                   | ENG159-A-1       | Plumbing compartment                                            | Engine 159; F2174; very dirty on piping                              |  |
| Arsenic and lead                   | ENG-583-A-02     | Truck bed where the hoses sit                                   | Engine 583; 1998;<br>F0581; used in Bobcat<br>fire; some ashy debris |  |
| Arsenic and lead                   | ENG-168-A-01     | Fuel cell directly beneath<br>the stainless-steel water<br>tank | Engine 168; F1567;<br>dusty/dirty                                    |  |
| Arsenic and lead                   | ENG-558-A-02     | Foam pump compartment                                           | Engine 558; 1998;<br>F0561; dusty/dirty                              |  |

In addition, four bulk samples of the vermiculite-coated fiberglass strips were analyzed for asbestos.

One field blank was collected from each of the analyses listed above, except for the bulk samples.

#### 4.3.2 Area samples

ToxStrategies collected two area PBZ air samples to be analyzed for the following chemicals:

- Benzene, ethylbenzene, and naphthalene using a 3M 3500/3520 organic vapor monitor
- Diesel particulate (as elemental carbon) by NIOSH 5040 using a quartz-fiber filter in a three-piece 37-mm cassette.

Because a field blank was collected for each of these chemicals, as described in Section 4.3.1, no additional field blanks were collected.

Cumene, tetrabromobisphenol-A, and methyl isobutyl ketone were also considered potential carcinogens of concern for the job task at the Eastern Fire Shop; however, these compounds were not measured quantitatively, because they do not have published cancer potency measures. Thus, their cancer risk assessment (Task 5) will be qualitative only.

#### 4.4 Wildfire Base Camp, Los Angeles County

#### 4.4.1 Repair of fire apparatus or other equipment

For the field-assigned FEM, the job task of repairing fire apparatuses or other equipment at a wildfire base camp ranked very high and was thus considered a high priority for Task 4. ToxStrategies planned to conduct PBZ air sampling among three field FEMs for the following chemicals:

- Acetaldehyde and formaldehyde by EPA TO-11A using an SKC 500-100, UMEx 100 passive sampler
- Benzene, ethylbenzene, and naphthalene using a 3M 3500/3520 organic vapor monitor
- Diesel particulates (as elemental carbon) by NIOSH 5040 using a quartz-fiber filter in a three-piece 37-mm cassette
- PAHs by NIOSH 5528 (draft) using a SKC 226-57, OSHA versatile sampler (XAD-7, glass fiber filter) tube.

Wipe samples on fire trucks and other field equipment that a field FEM would contact were planned to be collected for the following chemicals:

- PAHs by NIOSH 5528 using hexane-extracted gauze
- Arsenic and lead by NIOSH 9102 Mod. using Ghost Wipes
- Pentachlorophenol by OSHA 39 using sterile cotton gauze soaked in DI water
- Chlorinated dioxins/furans by EPA 1613B and PCBs by EPA 1668C using swabs soaked in hexane.

However, at the time of the study, there were no active fires in Los Angeles County; therefore, this job task will be assessed using the scientific literature for the cancer risk assessment in Task 5.

#### 4.5 Calibration of PBZ Air Samples

Personal air sampling pumps were calibrated using a primary or secondary calibration device, with the tubing and sampling cassette connected in-line. Pre- and post-flow rates were measured directly before and after the PBZ air sample was collected; flow rates that had a difference of greater than 5% were identified as estimated. Each analytical method defines the recommended flow rates.

#### 4.6 Laboratory Analysis

Most samples were analyzed by ALS Environmental, an AIHA-accredited laboratory, in Salt Lake City, Utah, under a standard turnaround time. The exception was the dioxins, furans, and PCB samples, which were shipped to ALS Environmental in Burlington, Ontario.

#### 5 Results

The analytical results for the submitted samples are presented below for each SEG and job task, and the laboratory reports are included in Attachment 1.

#### 5.1 Air Operations, Pacoima (November 3, 2020)

#### 5.1.1 PBZ air samples

Hexavalent chromium was measured in one sample collected among helicopter mechanics performing intermediate and heavy maintenance on the aircraft. One sample from each of these job tasks had a personal sampling air pump that failed during the sampling event; therefore, these samples were discarded and not analyzed. The analytical results are provided in Table 8.

Respirable crystalline silica as quartz, cristobalite, and tridymite were sampled among helicopter mechanics performing heavy maintenance on the aircraft. The analytical results are provided in Table 9. Respirable crystalline silica as quartz, cristobalite, and tridymite were not measured in any sample (Table 9).

Benzene, ethylbenzene, and naphthalene were analyzed in samples collected among helicopter mechanics performing intermediate maintenance on the aircraft. Two area samples were also measured in the hanger. One area sample was collected along the southwest wall, and one sample was collected in the work area. The analytical results are provided in Table 10; benzene, ethylbenzene, and naphthalene were not detected in any sample (Table 10).

Table 8. Hexavalent chromium personal breathing zone (PBZ) air sampling results analyzed by OSHA ID-215

| Sampling<br>Date                   | Employee<br>Name      | Job Task                                     | Sample<br>ID   | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | Hexavalent<br>Chromium<br>(mg/m³) |  |
|------------------------------------|-----------------------|----------------------------------------------|----------------|---------------------------------|---------------------------|-----------------------------------|--|
| 11/3/2020                          | Anthony<br>Velletto   | Intermediate & heavy maintenance on aircraft | HM-<br>1103-01 | 438                             | 876                       | <0.000068                         |  |
| 11/3/2020                          | Alexander<br>Gonzalez | Intermediate & heavy maintenance on aircraft | HM-<br>1103-02 | 465                             | 930                       | <0.000065                         |  |
| 11/3/2020                          | Ruben<br>Perez        | Intermediate & heavy maintenance on aircraft | HM-<br>1103-04 | 454                             | 908                       | <0.000066                         |  |
| 11/3/2020                          | Tyrone<br>Mathis      | Intermediate & heavy maintenance on aircraft | HM-<br>1103-08 | 426                             | 852                       | <0.000070                         |  |
| 11/3/2020                          | Jose<br>Murillo       | Heavy maintenance on aircraft                | HM-<br>1103-10 | 385                             | 770                       | <0.000078                         |  |
| 11/3/2020                          | Kevin<br>McDougall    | Intermediate & heavy maintenance on aircraft | HM-<br>1103-11 | 416                             | 832                       | <0.000072                         |  |
| 11/3/2020                          | James Ring            | Heavy maintenance on aircraft                | HM-<br>1103-12 | 314                             | 628                       | <0.000096                         |  |
| 11/3/2020                          | Terry<br>Apodaca      | Heavy maintenance on aircraft                | HM-<br>1103-13 | 372                             | 744                       | 0.000084                          |  |
| Cal/OSHA 8-hr TWA PEL <sup>†</sup> |                       |                                              |                |                                 |                           |                                   |  |
| Cal/OSHA 8-                        | -hr TWA actio         | n level <sup>†</sup>                         |                |                                 |                           | 0.0025                            |  |

<sup>† 8</sup> CCR§5206

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; PEL = permissible exposure limit; mg/m³ = milligrams per cubic meter of air; TWA = time-weighted average

**Bold** indicates detected result.

Table 9. Respirable crystalline silica personal breathing zone (PBZ) air sampling results analyzed by NIOSH 7500 Mod

| Sampling<br>Date | Employee Name         | Job Task                            | Sample<br>ID | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | Quartz;<br>cristobalite;<br>tridymite<br>(mg/m³) |
|------------------|-----------------------|-------------------------------------|--------------|---------------------------------|---------------------------|--------------------------------------------------|
| 11/3/2020        | Tyrone Mathis         | Heavy<br>maintenance<br>on aircraft | 40203        | 422                             | 1,055                     | <0.0047; <0.0047;<br><0.019                      |
| 11/3/2020        | Adam Parra            | Heavy<br>maintenance<br>on aircraft | 40204        | 417                             | 1,042.5                   | <0.0048; <0.0048;<br><0.019                      |
| 11/3/2020        | Jose Murillo          | Heavy<br>maintenance<br>on aircraft | 40174        | 393                             | 982.5                     | <0.0051; <0.0051;<br><0.020                      |
| 11/3/2020        | Kevin McDougall       | Heavy<br>maintenance<br>on aircraft | 40173        | 379*                            | 947.5                     | <0.0053; <0.0053;<br><0.021                      |
| 11/3/2020        | James Ring            | Heavy<br>maintenance<br>on aircraft | 40193        | 314                             | 785                       | <0.0064; <0.0064;<br><0.025                      |
| 11/3/2020        | Terry Apodaca         | Heavy<br>maintenance<br>on aircraft | 40163        | 374                             | 935                       | <0.0053; <0.0053;<br><0.021                      |
| Cal/OSHA 8-      | •                     | 0.050                               |              |                                 |                           |                                                  |
| Cal/OSHA 8-      | -hr TWA action level† |                                     |              |                                 |                           | 0.025                                            |

<sup>† 8</sup> CCR§1532.3 for respirable crystalline silica (quartz, cristobalite, and/or tridymite)

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; mg/m³ = milligrams per cubic meter of air; TWA = time-weighted average

<sup>\*</sup> Sample duration is uncertain; personal sampling air pump faulted between the times of 1:30pm and 3:15pm. Sample duration is based on an estimated sample end time of 2:30pm. The results may be biased high, but they were all non-detect.

Table 10. Benzene, ethylbenzene, and naphthalene personal breathing zone (PBZ) air sampling results analyzed by 3M 3500/3520 POVM

| Sampling<br>Date | Employee Name                                                | Job Task                                   | Sample<br>ID | Sample<br>Duration<br>(minutes) | Benzene (mg/m³) | Ethyl-<br>benzene<br>(mg/m³) | Naph-<br>thalene<br>(mg/m³) |
|------------------|--------------------------------------------------------------|--------------------------------------------|--------------|---------------------------------|-----------------|------------------------------|-----------------------------|
| 11/3/2020        | Anthony Velletto                                             | Intermediate<br>maintenance<br>on aircraft | EL0042       | 546                             | <0.052          | <0.67                        | <0.74                       |
| 11/3/2020        | Alexander<br>Gonzalez                                        | Intermediate<br>maintenance<br>on aircraft | EL0122       | 547                             | <0.051          | <0.67                        | <0.74                       |
| 11/3/2020        | Joseph Martinez                                              | Intermediate<br>maintenance<br>on aircraft | EL0053       | 547                             | <0.051          | <0.67                        | <0.74                       |
| 11/3/2020        | Ruben Perez                                                  | Intermediate<br>maintenance<br>on aircraft | EL0089       | 542                             | <0.052          | <0.68                        | <0.75                       |
| 11/3/2020        | Kevin McDougall                                              | Intermediate<br>maintenance<br>on aircraft | EL0134       | 467                             | <0.060          | <0.78                        | <0.87                       |
| 11/3/2020        | Tyrone Mathis                                                | Intermediate<br>maintenance<br>on aircraft | EL0146       | 461                             | <0.061          | <0.79                        | <0.88                       |
| 11/3/2020        | Area Sample #1 in<br>Hangar<br>(southwest wall in<br>Hangar) |                                            | EL0086       | 487                             | <0.058          | <0.75                        | <0.83                       |
| 11/3/2020        | Area Sample #2 in<br>Hangar (Work<br>Area)                   | General work<br>in Hangar                  | EL0132       | 486                             | <0.058          | <0.75                        | <0.84                       |
| Cal/OSHA 8-h     | nr TWA PEL <sup>†</sup>                                      | •                                          | 3.19         | 22                              | 0.5             |                              |                             |
| Cal/OSHA 8-h     |                                                              | 1.60                                       | NA           | NA                              |                 |                              |                             |

<sup>†8</sup> CCR§5218 for benzene (converted ppm units to mg/m³ using molar volume in liters at normal temperature and pressure [0 °C, 760 mmHg]), Title 8, Table AC-1 for ethylbenzene and naphthalene

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; TWA = time-weighted average; mg/m<sup>3</sup> = milligrams per cubic meter of air; PEL = permissible exposure limit; ppm = parts per million by volume; NA = not available

#### 5.1.2 Surface wipe samples (November 3, 2020)

A Firehawk and a Bell412 were parked inside the hangar for heavy maintenance. PAHs, arsenic, lead, and hexavalent chromium were analyzed for in wipe samples from various locations of these aircraft. The analytical results are provided in Table 11. Only hexavalent chromium and lead were measurable in any sample; no other chemicals were detected (Table 11).

Table 11. Wipe sample results on aircrafts in hangar

| Chemical | Method        | Sample<br>ID  | Sampling<br>Location                    | Observations<br>/ Notes | Result (µg/cm²)                                                                                                                                                                                                                                                              |                                                                                                                                                                                 |
|----------|---------------|---------------|-----------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | N190LA-<br>01 | Intermediate<br>gear box of<br>Firehawk | Fire residues/<br>dust  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050         |
| PAHs     | NIOSH<br>5528 | N14LA-<br>03  | Right<br>stabilator of<br>Bell412       | Fire residues/<br>dust  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |

| Chemical | Method        | Sample<br>ID  | Sampling<br>Location                                        | Observations<br>/ Notes | Result (µg/cm²                                                                                                                                                                                                                                                               | )                                                                                                                                                                                       |
|----------|---------------|---------------|-------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | N14LA-<br>02  | Right<br>tailbone of<br>Bell412                             | Fire residues/<br>dust  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |
| PAHs     | NIOSH<br>5528 | N14LA-<br>01  | Right side<br>of nose of<br>Bell412                         | Fire residues/<br>dust  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene:                       | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050         |
| PAHs     | NIOSH<br>5528 | N190LA-<br>02 | Upper aft<br>blade<br>antenna, left<br>side, of<br>Firehawk | Fire residues/<br>dust  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050         |

| Chemical          | Method               | Sample<br>ID    | Sampling<br>Location                                        | Observations<br>/ Notes | Result                                                                                                                                                                                                                                         | (μg/cm²)                                                                                                                                                                               |
|-------------------|----------------------|-----------------|-------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs              | NIOSH<br>5528        | N190LA-<br>03   | Transition access door, underside, of Firehawk              | Fire residues/<br>dust  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthere Benzo(a)pyrene: Indeno(1,2,3-cd)pyre Dibenzo(a,h)anthrace *Benzo(g,h,i)perylene | <ul> <li>&lt;0.0050</li> <li>de:</li> <li>&lt;0.0050</li> <li>de:</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>de:</li> <li>&lt;0.0050</li> <li>de:</li> <li>&lt;0.0050</li> </ul> |
| Arsenic /<br>Lead | NIOSH<br>9102<br>Mod | N190LA-<br>01-A | Intermediate<br>gear box of<br>Firehawk                     | Fire residues/<br>dust  | Arsenic: <0.063                                                                                                                                                                                                                                | Lead: <b>0.019</b>                                                                                                                                                                     |
| Arsenic /<br>Lead | NIOSH<br>9102<br>Mod | N190LA-<br>02-A | Upper aft<br>blade<br>antenna, left<br>side, of<br>Firehawk | Fire residues/<br>dust  | Arsenic: <0.063                                                                                                                                                                                                                                | Lead: <0.0050                                                                                                                                                                          |
| Arsenic /<br>Lead | NIOSH<br>9102<br>Mod | N14LA-<br>02-A  | Right<br>tailbone of<br>Bell412                             | Fire residues/<br>dust  | Arsenic: <0.063                                                                                                                                                                                                                                | Lead: <b>0.023</b>                                                                                                                                                                     |
| Arsenic /<br>Lead | NIOSH<br>9102<br>Mod | N14LA-<br>01-A  | Right side<br>of nose of<br>Bell412                         | Fire residues/<br>dust  | Arsenic: <0.063                                                                                                                                                                                                                                | Lead: 0.028                                                                                                                                                                            |
| Arsenic /<br>Lead | NIOSH<br>9102<br>Mod | N190LA-<br>03-A | Transition<br>access door,<br>underside,<br>of Firehawk     | Fire residues/<br>dust  | Arsenic: <0.063                                                                                                                                                                                                                                | Lead: <b>0.023</b>                                                                                                                                                                     |
| Arsenic /<br>Lead | NIOSH<br>9102<br>Mod | N14LA-<br>03-A  | Right<br>stabilator of<br>Bell412                           | Fire residues/<br>dust  | Arsenic: <0.063                                                                                                                                                                                                                                | Lead: <b>0.033</b>                                                                                                                                                                     |

| Chemical               | Method         | Sample<br>ID | Sampling<br>Location                                                    | Observations<br>/ Notes | Result (μg/cm²) |
|------------------------|----------------|--------------|-------------------------------------------------------------------------|-------------------------|-----------------|
| Hexavalent<br>chromium | OSHA<br>ID-215 | N14LA-<br>05 | Skid on<br>right side of<br>Bell412                                     | Mastinox visible        | 0.080           |
| Hexavalent<br>chromium | OSHA<br>ID-215 | N14LA-<br>06 | Mating<br>surface of<br>combining<br>gear box<br>trimount of<br>Bell412 | Mastinox<br>visible     | 0.54            |

Abbreviations: <= not detected;  $\mu g/cm^2 =$  micrograms per square centimeter; \* = not considered a carcinogen **Bold** indicates detected result.

A combination of Firehawks and Bell412s were parked outside on the flight line. PAHs, arsenic, lead, hexavalent chromium, chlorinated dioxins/furans, and PCBs were analyzed for in wipe samples from various locations of the aircraft. The analytical results are provided in Table 12. The analytical results for chlorinated dioxins/furans and PCBs were converted to a 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalence (TEO) concentration. Note that there are only 12 PCB congeners with published congener-specific toxicity equivalency factors (TEFs) (DTSC HERO, 2017; USEPA, 2010; van den Berg et al., 2006 [WHO report]). The TEQ is calculated by multiplying the TEF, which is an estimate of the congener-specific toxicity/potency relative to the toxicity/potency of TCDD (TEF value of 1), by the detected concentration of the dioxin or dioxin-like congener (DTSC HERO, 2017; USEPA, 2010; van den Berg et al., 2006 [WHO report]). The individual TEQ concentrations are then summed to yield the total TEO concentration for that sample. Therefore, the calculated TEQs are presented for chlorinated dioxins/furans and PCBs, where applicable. The non-TEQ PCBs total is also presented for each sample, which is calculated by summing the individual congeners without a TEF. Congeners that were non-detects were assigned values equal to 50% of the reporting limit for calculating the dioxin/furan/PCB TEQ and non-TEQ PCB totals for each sample. The laboratory reports found in Attachment 1 present the analytical results for each congener. Attachment 2 contains the analytical results by PCB and dioxin/furan congener (µg/cm<sup>2</sup>), TEFs applied, and TEQ calculations by Sample ID. PAHs and arsenic were not measured in any sample.

Table 12. Wipe sample results on aircrafts on flight line

| Chemical | Method        | Sample ID     | Sampling<br>Location                              | Observations/<br>Notes                                         | Result (μg/cm²)                                                                                                                                                                                                                                                              |                                                                                                                                                                                 |
|----------|---------------|---------------|---------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | N822LA-<br>01 | Right engine<br>exhaust<br>cowling of<br>Firehawk | Firehawk had<br>been to a recent<br>wildfire (October<br>2020) | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |
| PAHs     | NIOSH<br>5528 | N120LA-<br>01 | Tail of<br>Bell412                                | Bell412 had not<br>been cleaned<br>since usage in<br>wildfire  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |

| Chemical | Method        | Sample ID     | Sampling<br>Location                     | Observations/<br>Notes                                         | Result (μg/cm²)                                                                                                                                                                                                                                                              | ı                                                                                                                                                                               |
|----------|---------------|---------------|------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | N120LA-<br>02 | Blade<br>antenna of<br>Bell412           | Bell412 had not<br>been cleaned<br>since usage in<br>wildfire  | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |
| PAHs     | NIOSH<br>5528 | N822LA-<br>03 | Horizontal<br>stabilator of<br>Firehawk  | Firehawk had<br>been to a recent<br>wildfire (October<br>2020) | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene:                       | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050         |
| PAHs     | NIOSH<br>5528 | N822LA-<br>02 | Forward cowling, right side, of Firehawk | Firehawk had<br>been to a recent<br>wildfire (October<br>2020) | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |

| Chemical       | Method               | Sample ID       | Sampling<br>Location                               | Observations/<br>Notes                                         | Resi                                                                                                                                                                                                                       | ult (μg/cm²)                                                                                                                                                                                                                                                                                                                                                               |
|----------------|----------------------|-----------------|----------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs           | NIOSH<br>5528        | N120LA-<br>03   | Glass "sun<br>roof"/"greenh<br>ouse" of<br>Bell412 | Bell412 had not<br>been cleaned<br>since usage in<br>wildfire  | Naphthalene: *Acenaphthylene *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthrace Chrysene: Benzo(b)fluorant Benzo(a)pyrene: Indeno(1,2,3-cd)p Dibenzo(a,h)anth *Benzo(g,h,i)per | <ul> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>hene:</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>oyrene:</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> <li>&lt;0.0050</li> </ul> |
| Arsenic / Lead | NIOSH<br>9102<br>Mod | N120LA-<br>03-A | Glass "sun<br>roof"/"greenh<br>ouse" of<br>Bell412 | Bell412 had not<br>been cleaned<br>since usage in<br>wildfire  | Arsenic: <0.063                                                                                                                                                                                                            | Lead: <b>0.016</b>                                                                                                                                                                                                                                                                                                                                                         |
| Arsenic / Lead | NIOSH<br>9102<br>Mod | N822LA-<br>03-A | Horizontal<br>stabilator of<br>Firehawk            | Firehawk had<br>been to a recent<br>wildfire (October<br>2020) | Arsenic: <0.063                                                                                                                                                                                                            | Lead: <b>0.0091</b>                                                                                                                                                                                                                                                                                                                                                        |
| Arsenic / Lead | NIOSH<br>9102<br>Mod | N120LA-<br>01-A | Tail of<br>Bell412                                 | Bell412 had not<br>been cleaned<br>since usage in<br>wildfire  | Arsenic: <0.063                                                                                                                                                                                                            | Lead: <b>0.0082</b>                                                                                                                                                                                                                                                                                                                                                        |
| Arsenic / Lead | NIOSH<br>9102<br>Mod | N120LA-<br>02-A | Blade<br>antenna of<br>Bell412                     | Bell412 had not<br>been cleaned<br>since usage in<br>wildfire  | Arsenic: <0.063                                                                                                                                                                                                            | Lead: <b>0.016</b>                                                                                                                                                                                                                                                                                                                                                         |
| Arsenic / Lead | NIOSH<br>9102<br>Mod | N822LA-<br>01-A | Right engine<br>exhaust<br>cowling of<br>Firehawk  | Firehawk had<br>been to a recent<br>wildfire (October<br>2020) | Arsenic: <0.063                                                                                                                                                                                                            | Lead: <0.0050                                                                                                                                                                                                                                                                                                                                                              |
| Arsenic / Lead | NIOSH<br>9102<br>Mod | N822LA-<br>02-A | Forward<br>cowling, right<br>side, of<br>Firehawk  | Firehawk had<br>been to a recent<br>wildfire (October<br>2020) | Arsenic: <0.063                                                                                                                                                                                                            | Lead: <b>0.0085</b>                                                                                                                                                                                                                                                                                                                                                        |

| Chemical                   | Method         | Sample ID     | Sampling<br>Location                                | Observations/<br>Notes | Result (μg/cm²)                                                                       |
|----------------------------|----------------|---------------|-----------------------------------------------------|------------------------|---------------------------------------------------------------------------------------|
| Hexavalent<br>Chromium     | OSHA<br>ID-215 | N18LA-01      | Hot part of<br>left engine<br>(seam) of<br>Bell412  |                        | 0.0014                                                                                |
| Hexavalent<br>Chromium     | OSHA<br>ID-215 | N17LA-04      | Hot part of<br>left engine<br>(seam) of<br>Bell412  |                        | 0.00076                                                                               |
| Hexavalent<br>Chromium     | OSHA<br>ID-215 | N18LA-02      | Hot part of<br>right engine<br>(seam) of<br>Bell412 |                        | 0.0022                                                                                |
| Hexavalent<br>Chromium     | OSHA<br>ID-215 | N120LA-<br>01 | Hot part of<br>right engine<br>(seam) of<br>Bell412 |                        | 0.0019                                                                                |
| Hexavalent<br>Chromium     | OSHA<br>ID-215 | N120LA-<br>02 | Hot part of<br>left engine<br>(seam) of<br>Bell412  |                        | 0.0013                                                                                |
| Hexavalent<br>Chromium     | OSHA<br>ID-215 | N17LA-03      | Hot part of<br>left engine<br>(seam) of<br>Bell412  |                        | 0.0011                                                                                |
| PCBs                       | EPA<br>1668C   | 356-4         | Horizontal<br>stabilator of<br>Bell412              |                        | PCB TEQ †: <b>8.6x10</b> <sup>-10</sup><br>Non-TEQ PCB †: <b>2.9x10</b> <sup>-6</sup> |
| Chlorinated dioxins/furans | EPA<br>1613B   | 356-4         | Horizontal<br>stabilator of<br>Bell412              |                        | TEQ †: 1.3x10 <sup>-8</sup>                                                           |
| PCBs                       | EPA<br>1668C   | 356-5         | Chin bubble of Bell412                              |                        | PCB TEQ †: 1.2x10 <sup>-9</sup><br>Non-TEQ PCB †: 2.9x10 <sup>-6</sup>                |
| Chlorinated dioxins/furans | EPA<br>1613B   | 356-5         | Chin bubble of Bell412                              |                        | TEQ †: 1.5x10 <sup>-8</sup>                                                           |

Abbreviations: <= not detected;  $\mu g/cm^2 =$  micrograms per square centimeter; TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalence; TEQ concentrations are calculated by multiplying the toxic equivalency factor (TEF) by the detected concentration of the dioxin or dioxin-like congener (dioxin/furan/PCB); \*= not considered a carcinogen

**Bold** indicates detected result.

<sup>†</sup> Congeners that were non-detects were assigned values equal to 50% of the detection limit.

# 5.2 Breathing Apparatus Shop, Pacoima (November 3, 2020)

# 5.2.1 PBZ air samples

Benzene, ethylbenzene, naphthalene, styrene, acetaldehyde, and formaldehyde were analyzed in PBZ air samples collected among equipment maintenance workers in the small-engine repair shop. The analytical results are provided in Table 13 for benzene, ethylbenzene, naphthalene, and styrene, and in Table 14 results for acetaldehyde and formaldehyde are presented. Benzene, acetaldehyde, and formaldehyde were detected.

Table 13. Benzene, ethylbenzene, naphthalene, and styrene personal breathing zone (PBZ) air sampling results analyzed by 3M 3500/3520 POVM

| Sampling<br>Date | Employee<br>Name         | Job Task                                                          | Sample<br>ID | Sample<br>Duration<br>(minutes) | Benzene<br>(mg/m³) | Ethyl-<br>benzene<br>(mg/m³) | Naph-<br>thalene<br>(mg/m³) | Styrene (mg/m³) |
|------------------|--------------------------|-------------------------------------------------------------------|--------------|---------------------------------|--------------------|------------------------------|-----------------------------|-----------------|
| 11/3/2020        | Ariel Orozco             | Small engine<br>repair shop<br>equipment<br>maintenance<br>worker | EL0064       | 349                             | 0.68               | <1.0                         | <1.2                        | <0.99           |
| 11/3/2020        | Pedro Zuniga             | Small engine<br>repair shop<br>equipment<br>maintenance<br>worker | EL0139       | 349                             | 0.30               | <1.0                         | <1.2                        | <0.99           |
| Cal/OSHA 8       | -hr TWA PEL <sup>†</sup> | 3.19                                                              | 22           | 0.5                             | 215                |                              |                             |                 |
| Cal/OSHA 8       | -hr TWA action lev       | rel <sup>†</sup>                                                  |              |                                 | 1.60               | NA                           | NA                          | NA              |

<sup>† 8</sup> CCR§5218 for benzene (converted ppm units to mg/m³ using molar volume in liters at normal temperature and pressure [0 °C, 760 mmHg]), Title 8, Table AC-1 for ethylbenzene, naphthalene, and styrene

#### **Bold** indicates detected result.

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; TWA = time-weighted average; mg/m<sup>3</sup> = milligrams per cubic meter of air; ppm = parts per million by volume; NA = not available

Table 14. Acetaldehyde and formaldehyde personal breathing zone (PBZ) air sampling results analyzed by EPA TO-11A

| Sampling<br>Date | Employee<br>Name                                                               | Job Task                                              | Sample ID | Sample<br>Duration<br>(minutes) | Acetalde-<br>hyde<br>(mg/m³) | Formalde-<br>hyde<br>(mg/m³) |
|------------------|--------------------------------------------------------------------------------|-------------------------------------------------------|-----------|---------------------------------|------------------------------|------------------------------|
| 11/3/2020        | Ariel<br>Orozco                                                                | Small engine repair shop equipment maintenance worker | A295581   | 347                             | 0.027                        | 0.026                        |
| 11/3/2020        | Pedro Zuniga Small engine repair shop equipment maintenance worker A295575 347 |                                                       |           |                                 |                              |                              |
| Cal/OSHA 8-1     | 45                                                                             | 0.92                                                  |           |                                 |                              |                              |
| Cal/OSHA 8-1     | hr TWA action l                                                                | level <sup>†</sup>                                    |           |                                 | NA                           | 0.61                         |

<sup>† 8</sup> CCR§5217 for formaldehyde (converted ppm units to mg/m³ using molar volume in liters at normal temperature and pressure [0 °C, 760 mmHg]), Title 8, Table AC-1 for acetaldehyde

#### **Bold** indicates detected result.

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; TWA = time-weighted average; mg/m³ = milligrams per cubic meter of air; PEL = permissible exposure limit; ppm = parts per million by volume; NA = not available

# 5.2.2 Surface wipe samples

PAHs, arsenic, lead, chlorinated dioxins/furans, PCBs, and pentachlorophenol were analyzed in wipe samples collected from training and field air packs. PAHs, lead, chlorinated dioxins/furans, and PCBs were detected. The analytical results are provided in Table 15. Chlorinated dioxin/furan and PCB TEQ and non-TEQ totals, where applicable, are presented below; the analytical results for each congener are presented in the laboratory reports (Attachment 1). Congeners that were non-detects were assigned values equal to 50% of the reporting limit for calculating the dioxin/furan/PCB TEQ and non-TEQ PCB totals for each sample. Attachment 2 contains the analytical results by PCB and dioxin/furan congener (μg/cm²), TEFs applied, and TEQ calculations by Sample ID.

Table 15. Wipe sample results on air packs

| Chemical | Method        | Sample<br>ID           | Sampling<br>Location                   | Observations/<br>Notes | Result<br>(µg/cm²)                                                                                                                                                                                                                                                           |                                                                                                                                                                                         |
|----------|---------------|------------------------|----------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | A49996                 | Where air pump sits, northern location | Field air pack         | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050         |
| PAHs     | NIOSH<br>5528 | A50421<br>ENG-21-<br>4 | Where air pump sits, northern location | Field air pack         | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene:                       | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |

| Chemical | Method        | Sample<br>ID     | Sampling<br>Location                   | Observations/<br>Notes | Result<br>(µg/cm²)                                                                                                                                                                                                                                                           |                                                                                                                                                                         |
|----------|---------------|------------------|----------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | A5014 Q-<br>24-5 | Where air pump sits, northern location | Field air pack         | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene:                       | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |
| PAHs     | NIOSH<br>5528 | ECTC-T-8         | Where air pump sits, northern location | Training air pack      | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | 0.018<br>0.056<br><0.0050<br>0.020<br>0.14<br>0.030<br>0.12<br>0.090<br>0.048<br>0.050<br>0.10<br><0.0050<br>0.045<br>0.035<br>0.0071<br>0.038                          |
| PAHs     | NIOSH<br>5528 | ECTC-T-38        | Where air pump sits, northern location | Training air pack      | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene:                       | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <b>0.015</b> <0.0050 <b>0.018 0.015 0.0098 0.013 0.020 0.0070 0.0083 0.0091</b> <0.0050 <b>0.010</b>                            |

| Chemical          | Method            | Sample<br>ID               | Sampling<br>Location                     | Observations/<br>Notes |                                                                                                                                                                                                                                                  | esult<br>/cm²)                                        |
|-------------------|-------------------|----------------------------|------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| PAHs              | NIOSH<br>5528     | NCSO-04                    | Where air pump sits, northern location   | Training air pack      | Naphthalene: *Acenaphthylene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthen Benzo(a)pyrene: Indeno(1,2,3-cd)pyre Dibenzo(a,h)anthrace *Benzo(g,h,i)peryler | 0.035 e: 0.048 e: 0.016 0.030 ene: 0.020 ene: <0.0050 |
| Arsenic / Lead    | NIOSH<br>9102 Mod | ECTC-T-<br>8-A             | Where pump<br>sits, southern<br>location | Training air pack      | Arsenic: <0.063                                                                                                                                                                                                                                  | Lead: <b>0.017</b>                                    |
| Arsenic / Lead    | NIOSH<br>9102 Mod | ECTC-T-<br>38-A            | Where pump sits, southern location       | Training air pack      | Arsenic: <0.063                                                                                                                                                                                                                                  | Lead: <b>0.016</b>                                    |
| Arsenic / Lead    | NIOSH<br>9102 Mod | A49996-<br>QUT-<br>185-4-A | Where pump sits, southern location       | Field air pack         | Arsenic: <0.063                                                                                                                                                                                                                                  | Lead: <b>0.014</b>                                    |
| Arsenic / Lead    | NIOSH<br>9102 Mod | A50143-<br>Q-24-5-A        | Where pump sits, southern location       | Field air pack         | Arsenic: <0.063                                                                                                                                                                                                                                  | Lead: <b>0.013</b>                                    |
| Arsenic / Lead    | NIOSH<br>9102 Mod | NC50-4-<br>A               | Where pump sits, southern location       | Training air pack      | Arsenic: <0.063                                                                                                                                                                                                                                  | Lead: <b>0.027</b>                                    |
| Arsenic / Lead    | NIOSH<br>9102 Mod | AS0421-<br>ENG-21-<br>4-A  | Where pump<br>sits, southern<br>location | Field air pack         | Arsenic: <0.063                                                                                                                                                                                                                                  | Lead: <b>0.048</b>                                    |
| Pentachlorophenol | OSHA 39           | A50143-<br>Q-24-5          | Where pump<br>sits, middle<br>portion    | Field air pack         | <0.0050                                                                                                                                                                                                                                          |                                                       |
| Pentachlorophenol | OSHA 39           | ECTC-T-                    | Where pump<br>sits, middle<br>portion    | Training air pack      | <0.0050                                                                                                                                                                                                                                          |                                                       |

| Chemical                   | Method    | Sample<br>ID | Sampling<br>Location                  | Observations/<br>Notes                 | Result<br>(μg/cm²)                                                     |
|----------------------------|-----------|--------------|---------------------------------------|----------------------------------------|------------------------------------------------------------------------|
| PCBs                       | EPA 1668C | BA-1         | Where pump<br>sits, middle<br>portion | Field air pack;<br>AS0421-Eng-<br>21-4 | PCB TEQ †: <b>1.1x10</b> -9<br>Non-TEQ PCB †: <b>2.1x10</b> -5         |
| Chlorinated dioxins/furans | EPA 1613B | BA-1         | Where pump<br>sits, middle<br>portion | Field air pack;<br>AS0421-Eng-<br>21-4 | TEQ †: 1.7x10 <sup>-8</sup>                                            |
| PCBs                       | EPA 1668C | BA-2         | Where pump<br>sits, middle<br>portion | Training air pack; ECTC-T-42           | PCB TEQ †: 1.8x10 <sup>-9</sup><br>Non-TEQ PCB †: 1.7x10 <sup>-5</sup> |
| Chlorinated dioxins/furans | EPA 1613B | BA-2         | Where pump<br>sits, middle<br>portion | Training air pack; ECTC-T-42           | TEQ †: 3.0x10 <sup>-8</sup>                                            |

Abbreviations: <= not detected;  $\mu g/cm^2 =$  micrograms per square centimeter; TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalence; TEQ concentrations are calculated by multiplying the toxic equivalency factor (TEF) by the detected concentration of the dioxin or dioxin-like congener (dioxin/furan/PCB); \* = not considered a carcinogen

**Bold** indicates detected result.

PAHs, arsenic, and lead were analyzed in wipe samples on exterior locations of the fire hose. Lead was detected in each of the six surface wipes collected; PAHs and arsenic were not detected in any of the samples. The analytical results are provided in Table 16 below.

<sup>†</sup> Congeners that were non-detects were assigned values equal to 50% of the detection limit.

Table 16. Wipe sample results on fire hoses

| Chemical | Method        | Sample<br>ID | Sampling<br>Location | Observations/<br>Notes   | Result (μg/cm²)                                                                                                                                                                                                                                                              |                                                                                                                                                                         |
|----------|---------------|--------------|----------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | H-01         | Exterior of hose     | Fire hose,<br>very dirty | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |
| PAHs     | NIOSH<br>5528 | H-02         | Exterior of hose     | Fire hose                | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050         |

| Chemical | Method | Sample<br>ID | Sampling<br>Location | Observations/<br>Notes | Result<br>(μg/cm²)      |          |
|----------|--------|--------------|----------------------|------------------------|-------------------------|----------|
| PAHs     | NIOSH  | H-03         | Exterior of          | Fire hose              | Naphthalene:            | < 0.0050 |
| 171113   | 5528   | 11 03        | hose                 | The nose               | *Acenaphthylene:        | < 0.0050 |
|          | 3320   |              | nose                 |                        | *Acenaphthene:          | < 0.0050 |
|          |        |              |                      |                        | *Fluorene:              | < 0.0050 |
|          |        |              |                      |                        | *Phenanthrene:          | < 0.0050 |
|          |        |              |                      |                        | *Anthracene:            | < 0.0050 |
|          |        |              |                      |                        | *Fluoranthene:          | < 0.0050 |
|          |        |              |                      |                        | *Pyrene:                | < 0.0050 |
|          |        |              |                      |                        | Benzo(a)anthracene:     | < 0.0050 |
|          |        |              |                      |                        | Chrysene:               | < 0.0050 |
|          |        |              |                      |                        | Benzo(b)fluoranthene:   | < 0.0050 |
|          |        |              |                      |                        | Benzo(k)fluoranthene:   | < 0.0050 |
|          |        |              |                      |                        | Benzo(a)pyrene:         | < 0.0050 |
|          |        |              |                      |                        | Indeno(1,2,3-cd)pyrene: | < 0.0050 |
|          |        |              |                      |                        | Dibenzo(a,h)anthracene: | < 0.0050 |
|          |        |              |                      |                        | *Benzo(g,h,i)perylene:  | <0.0050  |
|          |        |              |                      |                        | belizo(g,ii,i)peryiene. |          |
| PAHs     | NIOSH  | H-04         | Exterior of          | Fire hose,             | Naphthalene:            | < 0.0050 |
|          | 5528   |              | hose                 | very dirty             | *Acenaphthylene:        | < 0.0050 |
|          |        |              |                      |                        | *Acenaphthene:          | < 0.0050 |
|          |        |              |                      |                        | *Fluorene:              | < 0.0050 |
|          |        |              |                      |                        | *Phenanthrene:          | < 0.0050 |
|          |        |              |                      |                        | *Anthracene:            | < 0.0050 |
|          |        |              |                      |                        | *Fluoranthene:          | < 0.0050 |
|          |        |              |                      |                        | *Pyrene:                | < 0.0050 |
|          |        |              |                      |                        | Benzo(a)anthracene:     | < 0.0050 |
|          |        |              |                      |                        | Chrysene:               | < 0.0050 |
|          |        |              |                      |                        | Benzo(b)fluoranthene:   | < 0.0050 |
|          |        |              |                      |                        | Benzo(k)fluoranthene:   | < 0.0050 |
|          |        |              |                      |                        | Benzo(a)pyrene:         | < 0.0050 |
|          |        |              |                      |                        | Indeno(1,2,3-cd)pyrene: | < 0.0050 |
|          |        |              |                      |                        | Dibenzo(a,h)anthracene: | < 0.0050 |
|          |        |              |                      |                        | *Benzo(g,h,i)perylene:  | < 0.0050 |
|          |        |              |                      |                        |                         |          |
| PAHs     | NIOSH  | H-05         | Exterior of          | Fire hose,             | Naphthalene:            | < 0.0050 |
|          | 5528   |              | hose                 | very dirty             | *Acenaphthylene:        | < 0.0050 |
|          |        |              |                      |                        | *Acenaphthene:          | < 0.0050 |
|          |        |              |                      |                        | *Fluorene:              | < 0.0050 |
|          |        |              |                      |                        | *Phenanthrene:          | < 0.0050 |
|          |        |              |                      |                        | *Anthracene:            | < 0.0050 |
|          |        |              |                      |                        | *Fluoranthene:          | < 0.0050 |
|          |        |              |                      |                        | *Pyrene:                | < 0.0050 |
|          |        |              |                      |                        | Benzo(a)anthracene:     | < 0.0050 |
|          |        |              |                      |                        | Chrysene:               | < 0.0050 |
|          |        |              |                      |                        | Benzo(b)fluoranthene:   | < 0.0050 |
|          |        |              |                      |                        | Benzo(k)fluoranthene:   | < 0.0050 |
|          |        |              |                      |                        | Benzo(a)pyrene:         | < 0.0050 |
|          |        |              |                      |                        | Indeno(1,2,3-cd)pyrene: | < 0.0050 |
|          |        |              |                      |                        | Dibenzo(a,h)anthracene: | < 0.0050 |
|          |        |              |                      |                        | *Benzo(g,h,i)perylene:  | < 0.0050 |

| Chemical          | Method            | Sample<br>ID | Sampling<br>Location | Observations/<br>Notes |                                                                                                                                                                                                                                                                                               | esult<br>g/cm²)     |
|-------------------|-------------------|--------------|----------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| PAHs              | NIOSH<br>5528     | Н-06         | Exterior of hose     | Fire hose              | Naphthalene: *Acenaphthylene: *Acenaphthylene: *Alcenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(k)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene *Benzo(g,h,i)perylene: |                     |
| Arsenic /<br>Lead | NIOSH<br>9102 Mod | H-01-A       | Exterior of hose     | Fire hose              | Arsenic: <0.063                                                                                                                                                                                                                                                                               | Lead: <b>0.0088</b> |
| Arsenic /<br>Lead | NIOSH<br>9102 Mod | H-02-A       | Exterior of hose     | Fire hose              | Arsenic: <0.063                                                                                                                                                                                                                                                                               | Lead: <b>0.0095</b> |
| Arsenic /<br>Lead | NIOSH<br>9102 Mod | H-03-A       | Exterior of hose     | Fire hose              | Arsenic: <0.063                                                                                                                                                                                                                                                                               | Lead: <b>0.0076</b> |
| Arsenic /<br>Lead | NIOSH<br>9102 Mod | H-04-A       | Exterior of hose     | Fire hose              | Arsenic: <0.063                                                                                                                                                                                                                                                                               | Lead: <b>0.025</b>  |
| Arsenic /<br>Lead | NIOSH<br>9102 Mod | H-05-A       | Exterior of hose     | Fire hose              | Arsenic: <0.063                                                                                                                                                                                                                                                                               | Lead: <b>0.13</b>   |
| Arsenic /<br>Lead | NIOSH<br>9102 Mod | H-06-A       | Exterior of hose     | Fire hose              | Arsenic: <0.063                                                                                                                                                                                                                                                                               | Lead: <b>0.056</b>  |

Abbreviations: <= not detected;  $\mu$ g/cm<sup>2</sup> = micrograms per square centimeter; \* = not considered a carcinogen;

**Bold** indicates detected result.

# 5.3 Eastern Fire Shop, Los Angeles (November 4, 2020)

# 5.3.1 PBZ air samples

Benzene, ethylbenzene, naphthalene, and diesel particulate as elemental carbon were analyzed in PBZ air samples among fire equipment mechanics performing maintenance on the fire apparatus. Two area samples were also analyzed for each of these chemicals in the Eastern Fire Shop. One area sample was collected in the center third aisle column (from the south entrance), and one sample was collected in the third bay along the west side (on

the workbench) of the Eastern Fire Shop. The analytical results are provided in Table 17 for benzene, ethylbenzene, and naphthalene, and in Table 18 for diesel particulate matter as elemental carbon. Benzene, ethylbenzene, and naphthalene were not measured in any sample; diesel particulate matter as elemental carbon was detected in one sample.

Table 17. Benzene, ethylbenzene, and naphthalene personal breathing zone (PBZ) air sampling results analyzed by 3M 3500/3520 POVM

| Sampling<br>Date | Employee<br>Name                        | Job Task                                | Sample<br>ID | Sample<br>Duration<br>(minutes) | Benzene<br>(mg/m³) | Ethyl-<br>benzene<br>(mg/m³) | Naph-<br>thalene<br>(mg/m³) |
|------------------|-----------------------------------------|-----------------------------------------|--------------|---------------------------------|--------------------|------------------------------|-----------------------------|
| 11/4/2020        | Rafael Flores                           | Maintenance on fire apparatus           | EL0128       | 422                             | < 0.067            | <0.87                        | <0.96                       |
| 11/4/2020        | Gary Hodge                              | Maintenance on fire apparatus           | EL0110       | 433                             | <0.065             | <0.85                        | <0.94                       |
| 11/4/2020        | Jairo Tapia                             | Maintenance on fire apparatus           | EL0102       | 440                             | < 0.064            | <0.83                        | <0.92                       |
| 11/4/2020        | James<br>Stolper                        | Maintenance on fire apparatus           | EL0135       | 436                             | < 0.065            | <0.84                        | <0.93                       |
| 11/4/2020        | Luis Del Cid                            | Maintenance on fire apparatus           | EL0129       | 427                             | <0.066             | <0.86                        | <0.95                       |
| 11/4/2020        | Alfredo<br>Sanchez                      | Maintenance on fire apparatus           | EL0107       | 396                             | <0.071             | <0.93                        | <1.0                        |
| 11/4/2020        | Area Sample<br>#1; Aisle 3rd<br>Column  | General work<br>in Eastern Fire<br>Shop | EL0232       | 430                             | <0.066             | <0.85                        | <0.95                       |
| 11/4/2020        | Area Sample<br>#2; West<br>Side 3rd Bay | General work<br>in Eastern Fire<br>Shop | EL0060       | 427                             | <0.066             | <0.86                        | <0.95                       |
| Cal/OSHA 8       | -hr TWA PEL <sup>†</sup>                | 3.19                                    | 22           | 0.5                             |                    |                              |                             |
| Cal/OSHA 8       | -hr TWA action                          | level <sup>†</sup>                      |              |                                 | 1.60               | NA                           | NA                          |

<sup>† 8</sup> CCR§5218 for benzene (converted ppm units to mg/m³ using molar volume in liters at normal temperature and pressure [0 °C, 760 mmHg]), Title 8, Table AC-1 for ethylbenzene and naphthalene

Abbreviations: < = not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; TWA = time-weighted average; mg/m³ = milligrams per cubic meter of air; PEL = permissible exposure limit; ppm = parts per million by volume; NA = not available

Table 18. Diesel particulate as elemental carbon personal breathing zone (PBZ) air sampling results analyzed by NIOSH 5040

| Sampling<br>Date | Employee<br>Name                           | Job Task                             | Sample<br>ID | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(liters) | Elemental<br>Carbon<br>(mg/m³) |
|------------------|--------------------------------------------|--------------------------------------|--------------|---------------------------------|---------------------------|--------------------------------|
| 11/4/2020        | Rafael<br>Flores                           | Maintenance on fire apparatus        | 11401        | 397                             | 754.3                     | <0.0024                        |
| 11/4/2020        | Gary Hodge                                 | Maintenance on fire apparatus        | 11402        | 408                             | 816                       | <0.0022                        |
| 11/4/2020        | Jairo Tapia                                | Maintenance on fire apparatus        | 11403        | 416                             | 832                       | <0.0022                        |
| 11/4/2020        | James<br>Stolper                           | Maintenance on fire apparatus        | 11404        | 403                             | 806                       | <0.0022                        |
| 11/4/2020        | Luis Del<br>Cid                            | Maintenance on fire apparatus        | 11405        | 393                             | 786                       | 0.180                          |
| 11/4/2020        | Alfredo<br>Sanchez                         | Maintenance on fire apparatus        | 11406        | 359                             | 718                       | <0.0025                        |
| 11/4/2020        | Area<br>Sample #1;<br>Aisle 3rd<br>Column  | General work in<br>Eastern Fire Shop | 11407        | 429                             | 858                       | <0.0021                        |
| 11/4/2020        | Area<br>Sample #2;<br>West Side<br>3rd Bay | General work in<br>Eastern Fire Shop | 11408        | 426                             | 852                       | <0.0021                        |
| Cal/OSHA 8       | -hr TWA PEL <sup>†</sup>                   |                                      |              |                                 |                           | NA                             |

<sup>†</sup> No Cal/OSHA PEL established

**Bold** indicates detected result.

Abbreviations: < = not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; TWA = time-weighted average; mg/m³ = milligrams per cubic meter of air; PEL = permissible exposure limit; ppm = parts per million by volume; NA = not available

PBZ air samples for two fire equipment mechanics were analyzed for welding-fume metals, including hexavalent chromium. During the welding activity, the fire equipment mechanics were a half-face P-100 respirator with a face shield. The total welding time was approximately 30 to 45 minutes, and the grinding/cutting time was approximately 4 hours. Both fire equipment mechanics performed MIG (metal inert gas) welding. Only cobalt and nickel were detected. The welding-fume metals and hexavalent chromium exposure results are presented in Tables 19 and 20, respectively.

Table 19. Welding-fume metals personal breathing zone (PBZ) air sampling results analyzed by NIOSH 7300 Mod

| Sampling<br>Date                            | Employee<br>Name | Job Task                            | Sample<br>ID | Sample<br>Duration<br>(minutes) | Arsenic (mg/m³) | Beryllium<br>(mg/m³) | Cadmium<br>(mg/m³) | Cobalt<br>(mg/m³) | Lead<br>(mg/m³) | Nickel<br>(mg/m³) |
|---------------------------------------------|------------------|-------------------------------------|--------------|---------------------------------|-----------------|----------------------|--------------------|-------------------|-----------------|-------------------|
| 11/4/2020                                   | Luis del<br>Cid  | Maintenance<br>on fire<br>apparatus | MET01        | 391                             | <0.0032         | <0.000016            | <0.000096          | 0.00018           | <0.00064        | 0.0019            |
| 11/4/2020                                   | Paul Patao       | Maintenance<br>on fire<br>apparatus | MET02        | 294                             | <0.0043         | <0.000021            | <0.00013           | <0.00013          | <0.00085        | 0.00052           |
| Cal/OSHA                                    | 8-hr TWA PE      | L <sup>†</sup>                      |              |                                 | 0.01            | 0.0002               | 0.005              | 0.020             | 0.05            | 0.5               |
| Cal/OSHA 8-hr TWA action level <sup>†</sup> |                  |                                     |              | 0.005                           | 0.0001          | 0.0025               | NA                 | 0.03              | NA              |                   |

<sup>† 8</sup> CCR§5214 for arsenic, 8 CCR§5205 for beryllium, 8 CCR§5207 for cadmium, 8 CCR§5198 for lead, Title 8, Table AC-1 for cobalt and nickel

#### **Bold** indicates detected result.

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; TWA = time-weighted average; mg/m³ = milligrams per cubic meter of air; PEL = permissible exposure limit; NA = not available

Table 20. Hexavalent chromium in welding personal breathing zone (PBZ) air sampling results analyzed by OSHA ID-215

| Sampling<br>Date | Employee<br>Name  | Job Task                            | Sample<br>ID | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | Hexavalent chromium (mg/m³) |
|------------------|-------------------|-------------------------------------|--------------|---------------------------------|---------------------------|-----------------------------|
| 11/4/2020        | Luis del Cid      | Maintenance<br>on fire<br>apparatus | FM-002       | 389                             | 778                       | <0.000077                   |
| 11/4/2020        | Paul Patao        | Maintenance on fire apparatus       | FM-001       | 293                             | 586                       | <0.00010                    |
| Cal/OSHA 8-      | 0.005             |                                     |              |                                 |                           |                             |
| Cal/OSHA 8-      | -hr TWA action le | vel <sup>†</sup>                    |              |                                 |                           | 0.0025                      |

<sup>†8</sup> CCR§5206

Abbreviations: < = not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; PEL = permissible exposure limit; TWA = time-weighted average; mg/m³ = milligrams per cubic meter of air

N,N-dimethyl-para-toluidine was analyzed in the PBZ air among six fire equipment mechanics performing maintenance on the fire apparatus; however, one personal sampling air pump failed during the sampling event; therefore, this sample was discarded and not analyzed. Sample ID 01875 had a measured pre- and post-flow rate that was different by approximately 13%; therefore, the reporting limit in the table is an estimate. The true reporting limit is between 0.00047 and 0.00055 mg/m³, assuming the pre-flow rate (minimum reporting limit value of <0.00047 mg/m³) and the post-flow rate (maximum reporting limit value of <0.00055 mg/m³) as the average flow rates used to calculate exposure. The analytical results for the remaining five samples are provided in Table 21 below; no samples were detected above the reporting limit.

Table 21. N,N-dimethyl-para-toluidine personal breathing zone (PBZ) air sampling results analyzed by IH by GC-MS Scan

| Sampling<br>Date | Employee<br>Name                   | Job Task                            | Sample<br>ID | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | N,N-Dimethyl-<br>Para-Toluidine<br>(mg/m³) |  |  |  |  |
|------------------|------------------------------------|-------------------------------------|--------------|---------------------------------|---------------------------|--------------------------------------------|--|--|--|--|
| 11/4/2020        | Rafael Flores                      | Maintenance<br>on fire<br>apparatus | 01872        | 346                             | 124.56                    | <0.00040                                   |  |  |  |  |
| 11/4/2020        | Jairo Tapia                        | Maintenance<br>on fire<br>apparatus | 01392        | 372                             | 133.73                    | <0.00037                                   |  |  |  |  |
| 11/4/2020        | James Stolper                      | Maintenance<br>on fire<br>apparatus | 01871        | 331                             | 117.51                    | <0.00043                                   |  |  |  |  |
| 11/4/2020        | Paul Patao                         | Maintenance<br>on fire<br>apparatus | 01875        | 308                             | 98.41                     | <0.00051*                                  |  |  |  |  |
| 11/4/2020        | Alfredo<br>Sanchez                 | Maintenance<br>on fire<br>apparatus | 01823        | 301                             | 107.76                    | <0.00046                                   |  |  |  |  |
| Cal/OSHA 8       | Cal/OSHA 8-hr TWA PEL <sup>†</sup> |                                     |              |                                 |                           |                                            |  |  |  |  |

<sup>†</sup> No Cal/OSHA PEL established

Abbreviations: <= not detected; Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; mg/m<sup>3</sup> = millograms per cubic meter of air; PEL = permissible exposure limit; TWA = time-weighted average

<sup>\*</sup> The pre- and post- flow rate was different by approximately 13%; therefore, this reporting limit is an estimate (the true reporting limit is between 0.00047 and 0.00055 mg/m³).

Tetrachloroethylene was analyzed and detected in the PBZ air among six fire equipment mechanics performing maintenance on the fire apparatus on November 4, 2020. Three samples had a pre- and post-flow rate difference of greater than 5%. The samples and their estimated values are described below:

- Sample ID 72775 had a measured pre- and post-flow rate that was different by approximately 11%; therefore, the result in the table is an estimate. The true result is between 15 and 17 mg/m³, assuming the pre-flow rate (minimum value of 15 mg/m³) and the post-flow rate (maximum value of 17 mg/m³) as the average flow rates used to calculate exposure.
- Sample ID 72780 had a measured pre- and post-flow rate that was different by approximately 8%; therefore, the result in the table is an estimate. The true result is between 17 and 18 mg/m³, assuming the pre-flow rate (minimum value of 17 mg/m³) and the post-flow rate (maximum value of 18 mg/m³) as the average flow rates used to calculate exposure.
- Sample ID 72779 had a measured pre- and post-flow rate that was different by approximately 28%; therefore, the result in the table is an estimate. The true result is between 64 and 90 mg/m³, assuming the pre-flow rate (minimum value of 64 mg/m³) and the post-flow rate (maximum value of 90 mg/m³) as the average flow rates used to calculate exposure.

The exposure results for all six samples are provided in Table 22.

Table 22. Tetrachloroethylene personal breathing zone (PBZ) air sampling results analyzed by NIOSH 1003

| Sampling<br>Date | Employee<br>Name         | Job Task                            | Sample<br>ID | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(liters) | Tetrachloro-<br>ethylene<br>(mg/m³) |
|------------------|--------------------------|-------------------------------------|--------------|---------------------------------|---------------------------|-------------------------------------|
| 11/4/2020        | Paul Patao               | Maintenance<br>on fire<br>apparatus | 72773        | 310                             | 38.44                     | 67                                  |
| 11/4/2020        | Gary Hodge               | Maintenance<br>on fire<br>apparatus | 72775        | 331                             | 42.20                     | 16*                                 |
| 11/4/2020        | James Stolper            | Maintenance<br>on fire<br>apparatus | 72776        | 332                             | 49.30                     | 12                                  |
| 11/4/2020        | Alfredo<br>Sanchez       | Maintenance<br>on fire<br>apparatus | 72780        | 298                             | 45.30                     | 17**                                |
| 11/4/2020        | Dennis Farrell           | Maintenance<br>on fire<br>apparatus | 72781        | 306                             | 47.58                     | 27                                  |
| 11/4/2020        | Rafael Flores            | Maintenance<br>on fire<br>apparatus | 72779        | 298                             | 38.59                     | 75***                               |
| Cal/OSHA 8       | -hr TWA PEL <sup>†</sup> |                                     |              |                                 |                           | 170                                 |

<sup>†</sup> Title 8, Table AC-1

#### **Bold** indicates detected result.

Abbreviations: Cal/OSHA = California Division of Occupational Safety and Health (DOSH); CCR = California Code of Regulations; hr = hour; PEL = permissible exposure limit; TWA = time-weighted average;  $mg/m^3 = millograms$  per cubic meter of air

<sup>\*</sup> The pre- and post- flow rate was different by approximately 11%; therefore, this result is an estimate (the true result is between 15 and 17 mg/m³).

<sup>\*\*</sup> The pre- and post- flow rate was different by approximately 8%; therefore, this result is an estimate (the true result is between 17 and 18 mg/m³).

<sup>\*\*\*</sup> The pre- and post- flow rate was different by approximately 28%; therefore, this result is an estimate (the true result is between 64 and 90 mg/m³).

# 5.3.2 Surface wipe samples

PAHs, pentachlorophenol, lead, arsenic, chlorinated dioxins/furans and PCBs were analyzed in wipe samples from various locations on the fire truck. Only lead, chlorinated dioxins/furans, and PCBs were detected. The analytical results are provided in Table 23. Chlorinated dioxin/furan and PCB TEQ and non-TEQ totals, where applicable, are presented below; the analytical results for each congener are presented in the laboratory reports (Attachment 1). Congeners that were non-detects were assigned values equal to 50% of the reporting limit for calculating the dioxin/furan/PCB TEQ and non-TEQ PCB totals for each sample. Attachment 2 contains the analytical results by PCB and dioxin/furan congener (μg/cm²), TEFs applied, and TEQ calculations by Sample ID.

Table 23. Wipe sample results on fire trucks

| Chemical | Method        | Sample<br>ID           | Sampling<br>Location        | Observations/<br>Notes                        | Result (μg/cm²)                                                                                                                                                                                                                                        |                                                                                                                                                                         |
|----------|---------------|------------------------|-----------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | ENG-<br>558-<br>PAH-01 | Under<br>captain's<br>chair | Engine 558;<br>1998; F0561;<br>very dusty     | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |
| PAHs     | NIOSH<br>5528 | ENG-<br>159-<br>PAH-01 | Plumbing compartment        | Engine 159;<br>F2174; very<br>dirty on piping | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |

| Chemical | Method        | Sample<br>ID           | Sampling<br>Location                | Observations/<br>Notes                                                     | Result (μg/cm²)                                                                                                                                                                                                                                          |                                                                                                                                                                                 |
|----------|---------------|------------------------|-------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs     | NIOSH<br>5528 | ENG-<br>583-<br>PAH-02 | Truck bed<br>where the<br>hoses sit | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; some ashy<br>debris | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Fluoranthene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050                         |
| PAHs     | NIOSH<br>5528 | ENG-<br>583-<br>PAH-01 | Left rear frame at differential     | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; very dirty          | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Fluoranthene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene: | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050                         |
| PAHs     | NIOSH<br>5528 | ENG-<br>558-<br>PAH-02 | Foam pump compartment               | Engine 558;<br>1998; F0561;<br>dusty/dirty                                 | Naphthalene: *Acenaphthylene: *Acenaphthene: *Fluorene: *Phenanthrene: *Anthracene: *Fluoranthene: *Pyrene: Benzo(a)anthracene: Chrysene: Benzo(b)fluoranthene: Benzo(a)pyrene: Indeno(1,2,3-cd)pyrene: Dibenzo(a,h)anthracene: *Benzo(g,h,i)perylene:   | <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 <0.0050 |

| Chemical          | Method        | Sample<br>ID                 | Sampling<br>Location                                                        | Observations/<br>Notes                                                     | Result (μg/cm²)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|---------------|------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PAHs              | NIOSH<br>5528 | ENG-<br>168-<br>PAH-01       | Fuel cell<br>directly<br>underneath<br>the stainless<br>steel water<br>tank | Engine 168;<br>F1567;<br>dusty/dirty                                       | Naphthalene:       <0.0050         *Acenaphthylene:       <0.0050         *Acenaphthene:       <0.0050         *Fluorene:       <0.0050         *Phenanthrene:       <0.0050         *Anthracene:       <0.0050         *Fluoranthene:       <0.0050         *Pyrene:       <0.0050         Benzo(a)anthracene:       <0.0050         Chrysene:       <0.0050         Benzo(b)fluoranthene:       <0.0050         Benzo(a)pyrene:       <0.0050         Indeno(1,2,3-cd)pyrene:       <0.0050         Dibenzo(a,h)anthracene:       <0.0050         *Benzo(g,h,i)perylene:       <0.0050 |
| Pentachlorophenol | OSHA<br>39    | ENG-<br>168-<br>PENTA-<br>01 | Fuel cell<br>directly<br>underneath<br>the stainless<br>steel water<br>tank | Engine 168;<br>F1567;<br>dusty/dirty                                       | <0.0050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pentachlorophenol | OSHA<br>39    | ENG-<br>583-<br>PENTA-<br>01 | Left rear<br>frame at<br>differential                                       | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; very dirty          | <0.0050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pentachlorophenol | OSHA<br>39    | ENG-<br>558-<br>PENTA-<br>01 | Under<br>captain's<br>chair                                                 | Engine 558;<br>1998; F0561;<br>very dusty                                  | <0.0050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pentachlorophenol | OSHA<br>39    | ENG-<br>583-<br>PENTA-<br>02 | Truck bed<br>where the<br>hoses sit                                         | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; some ashy<br>debris | <0.0050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pentachlorophenol | OSHA<br>39    | ENG159-<br>PENTA-1           | Plumbing compartment                                                        | Engine 159;<br>F2174; very<br>dirty on piping                              | <0.0050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Pentachlorophenol | OSHA<br>39    | ENG-<br>558-<br>PENTA-<br>02 | Foam pump compartment                                                       | Engine 558;<br>1998; F0561;<br>dusty/dirty                                 | <0.0050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Chemical                   | Method               | Sample<br>ID           | Sampling<br>Location                                                        | Observations/<br>Notes                                                     | Resul                                                          | t (μg/cm²)         |
|----------------------------|----------------------|------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------|--------------------|
| Arsenic / Lead             | NIOSH<br>9102<br>Mod | ENG583-<br>A-1         | Left rear<br>frame at<br>differential                                       | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; very dirty          | Arsenic: <0.063                                                | Lead: <b>0.54</b>  |
| Arsenic / Lead             | NIOSH<br>9102<br>Mod | ENG-<br>558-A-01       | Captain's kick panel                                                        | Engine 558;<br>1998; F0561;<br>very dusty                                  | Arsenic: <0.063                                                | Lead: <b>0.059</b> |
| Arsenic / Lead             | NIOSH<br>9102<br>Mod | ENG159-<br>A-1         | Plumbing compartment                                                        | Engine 159;<br>F2174; very<br>dirty on piping                              | Arsenic: <0.063                                                | Lead: <b>0.25</b>  |
| Arsenic / Lead             | NIOSH<br>9102<br>Mod | ENG-<br>583-A-02       | Truck bed<br>where the<br>hoses sit                                         | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; some ashy<br>debris | Arsenic: <0.063                                                | Lead: <b>0.035</b> |
| Arsenic / Lead             | NIOSH<br>9102<br>Mod | ENG-<br>168-A-01       | Fuel cell<br>directly<br>underneath<br>the stainless<br>steel water<br>tank | Engine 168;<br>F1567;<br>dusty/dirty                                       | Arsenic: <0.063                                                | Lead: <b>0.046</b> |
| Arsenic / Lead             | NIOSH<br>9102<br>Mod | ENG-<br>558-A-02       | Foam pump compartment                                                       | Engine 558;<br>1998; F0561;<br>dusty/dirty                                 | Arsenic: <0.063                                                | Lead: <b>0.030</b> |
| PCBs                       | EPA<br>1668C         | ENG-<br>558-DFP-<br>02 | Foam pump compartment                                                       | Engine 558;<br>1998; F0561;<br>dusty/dirty                                 | PCB TEQ †: <b>1.2x</b><br>Non-TEQ PCB †:                       |                    |
| Chlorinated dioxins/furans | EPA<br>1613B         | ENG-<br>558-DFP-<br>02 | Foam pump compartment                                                       | Engine 558;<br>1998; F0561;<br>dusty/dirty                                 | TEQ †: 1.8x10 <sup>-8</sup>                                    |                    |
| PCBs                       | EPA<br>1668C         | ENG-<br>583-DFP-<br>02 | Truck bed<br>where the<br>hoses sit                                         | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; some ashy<br>debris | PCB TEQ †: <b>1.6x10</b> -9<br>Non-TEQ PCB †: <b>3.6x10</b> -5 |                    |
| Chlorinated dioxins/furans | EPA<br>1613B         | ENG-<br>583-DFP-<br>02 | Truck bed<br>where the<br>hoses sit                                         | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; some ashy<br>debris | TEQ †: 1.6x10 <sup>-8</sup>                                    |                    |

| Chemical                   | Method       | Sample<br>ID           | Sampling<br>Location                                                        | Observations/<br>Notes                                            | Result (μg/cm²)                                                                                        |
|----------------------------|--------------|------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| PCBs                       | EPA<br>1668C | ENG-<br>168-DFP-<br>01 | Fuel cell<br>directly<br>underneath<br>the stainless<br>steel water<br>tank | Engine 168;<br>F1567;<br>dusty/dirty                              | PCB TEQ †: <b>1.5x10</b> -9<br>Non-TEQ PCB †: <b>3.3x10</b> -5                                         |
| Chlorinated dioxins/furans | EPA<br>1613B | ENG-<br>168-DFP-<br>01 | Fuel cell<br>directly<br>underneath<br>the stainless<br>steel water<br>tank | Engine 168;<br>F1567;<br>dusty/dirty                              | TEQ †: 2.0x10 <sup>-8</sup>                                                                            |
| PCBs                       | EPA<br>1668C | ENG-<br>159-DFP-<br>1  | Plumbing compartment                                                        | Engine 159;<br>F2174; very<br>dirty on piping                     | PCB TEQ †: <b>4.4</b> x <b>10</b> <sup>-9</sup><br>Non-TEQ PCB †: <b>2.3</b> x <b>10</b> <sup>-5</sup> |
| Chlorinated dioxins/furans | EPA<br>1613B | ENG-<br>159-DFP-<br>1  | Plumbing compartment                                                        | Engine 159;<br>F2174; very<br>dirty on piping                     | TEQ †: 2.2x10 <sup>-8</sup>                                                                            |
| PCBs                       | EPA<br>1668C | ENG-<br>583-DFP-<br>01 | Left rear<br>frame at<br>differential                                       | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; very dirty | PCB TEQ †: <b>5.1</b> x <b>10</b> <sup>-9</sup><br>Non-TEQ PCB †: <b>9.4</b> x <b>10</b> <sup>-5</sup> |
| Chlorinated dioxins/furans | EPA<br>1613B | ENG-<br>583-DFP-<br>01 | Left rear<br>frame at<br>differential                                       | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; very dirty | TEQ †: 3.0x10 <sup>-8</sup>                                                                            |
| PCBs                       | EPA<br>1668C | ENG-<br>558-DFP-<br>01 | Under<br>captain's<br>chair                                                 | Engine 558;<br>1998; F0561;<br>very dusty                         | PCB TEQ †: 3.2x10 <sup>-9</sup><br>Non-TEQ PCB †: 3.0x10 <sup>-5</sup>                                 |
| Chlorinated dioxins/furans | EPA<br>1613B | ENG-<br>558-DFP-<br>01 | Under captain's chair                                                       | Engine 558;<br>1998; F0561;<br>very dusty                         | TEQ †: 2.1x10 <sup>-8</sup>                                                                            |

Abbreviations: <= not detected;  $\mu$ g/cm² = micrograms per square centimeter; TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalence; TEQ concentrations are calculated by multiplying the toxic equivalency factor (TEF) by the detected concentration of the dioxin or dioxin-like congener (dioxin/furan/PCB); \* = not considered a carcinogen

**Bold** indicates detected result.

<sup>†</sup> Congeners that were non-detects were assigned values equal to 50% of the detection limit.

# 5.3.3 Asbestos bulk samples

Four bulk samples of the vermiculite-coated fiberglass strips used to wrap the exhaust of a fire apparatus were analyzed for asbestos (chrysotile, amosite, crocidolite, actinolite/tremolite, and anthophyllite). Historically, vermiculite had the potential to contain traces of asbestos, which is a carcinogen. Based on the results from the four samples, presented in Table 24, no asbestos was detected. The wrap samples were taken from a brand new roll, as well as from a 1998, a 2006, and a 1995 fire truck.

Table 24. Asbestos bulk sample results of vermiculite-coated fiberglass strips analyzed by NIOSH 9002 Mod

| Chemical | Sample ID | Sample Description                             | Result (%)                                                         |                                      |
|----------|-----------|------------------------------------------------|--------------------------------------------------------------------|--------------------------------------|
| Asbestos | #1        | New roll                                       | Chrysotile Amosite Crocidolite Actinolite/ Tremolite Anthophyllite | <1.0<br><1.0<br><1.0<br><1.0<br><1.0 |
| Asbestos | #2        | Truck 532A (1998)                              | Chrysotile Amosite Crocidolite Actinolite/ Tremolite Anthophyllite | <1.0<br><1.0<br><1.0<br><1.0<br><1.0 |
| Asbestos | #3        | Truck (Emergency Fire<br>Service) F1484 (2006) | Chrysotile Amosite Crocidolite Actinolite/ Tremolite Anthophyllite | <1.0<br><1.0<br><1.0<br><1.0<br><1.0 |
| Asbestos | #4        | Truck 5166 F0181 (1995)                        | Chrysotile Amosite Crocidolite Actinolite/ Tremolite Anthophyllite | <1.0<br><1.0<br><1.0<br><1.0<br><1.0 |

Abbreviations: <= not detected; % = percent

# **6** Conclusions

Of the samples collected at Air Operations, hexavalent chromium, lead, PCBs, and chlorinated dioxins/furans were measured in the following samples:

- Hexavalent chromium was detected in the PBZ air sample from a helicopter mechanic performing heavy aircraft maintenance in the hangar (sample ID HM-1103-13); the exposure result was one order of magnitude below the Cal/OSHA action level and permissible exposure limit (PEL).
- Hexavalent chromium was detected in the two wipe samples collected from Mastinox-coated surfaces on the Bell412 aircraft located inside the hangar; the results were 0.080 μg/cm² for sample ID N14LA-05 and 0.54 μg/cm² for sample ID N14LA-06.
- Hexavalent chromium was detected in all six surface wipe samples collected on the hot part of the Bell412 engines parked on the flight line<sup>1</sup> (sample IDs N18LA-01, N17LA-04, N18LA-02, N120LA-01, N120LA-02, N17LA-03). The results ranged between 0.00076 and 0.0022 μg/cm<sup>2</sup>.
- Lead was detected in five of six surface wipe samples collected on various locations of the aircraft parked on the flight line (sample IDs N120LA-03-A, N822LA-03-A, N120LA-01-A, N120LA-02-A, N822LA-02-A). The detected results ranged between 0.0082 and 0.016 µg/cm<sup>2</sup>.
- Lead was detected in five of six surface wipe samples collected on various locations of the aircraft parked in the hangar (sample IDs N190LA-01-A, N14LA-02-A, N14LA-01-A, N190LA-03-A, N14LA-03-A). The detected results ranged between 0.019 and 0.033 μg/cm<sup>2</sup>.
- PCBs and chlorinated dioxins/furans were detected in the surface wipe samples collected on the horizontal stabilator (sample ID 356-4) and the chin bubble (sample ID 356-5) of the Bell412 parked on the flight line. The PCB TEQ maximum result was 1.2x10<sup>-9</sup> μg/cm<sup>2</sup>, the non-TEQ PCB maximum result was 4.2x10 μg/cm<sup>2</sup>, and the chlorinated dioxin/furan TEQ maximum result was 1.5x10<sup>-8</sup> μg/cm<sup>2</sup>.

In the samples collected at the Breathing Apparatus Shop in Pacoima, benzene, acetaldehyde, formaldehyde, PAHs, lead, PCBs, and chlorinated dioxins/furans were detected:

• Benzene was detected in the PBZ air samples collected from both equipment maintenance workers working in the small-engine repair shop (0.68 mg/m<sup>3</sup> in

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Recent communication (July 2020) from Pratt Whitney stated that hexavalent chromium could be present on the engine, and that the engine should not be cleaned by blowing air onto the surface.

- sample ID EL0064 and 0.30 mg/m<sup>3</sup> in sample ID EL0139); the exposures were below the Cal/OSHA action level and PEL.
- Acetaldehyde and formaldehyde were detected in the PBZ air samples collected from both equipment maintenance workers working in the small engine repair shop (sample IDs A295581 and A295575). Acetaldehyde detected results (0.027 mg/m³) were three orders of magnitude below the Cal/OSHA PEL, and formaldehyde detected results (0.026 and 0.028 mg/m³ for sample IDs A295581 and A295575, respectively) were one order of magnitude below the Cal/OSHA PEL.
- PAHs were detected in the surface wipe samples from the training air packs (sample IDs ECTC-T-8, ECTC-T-38, NCSO-04), but not from the field air packs.
- PCBs and chlorinated dioxins/furans were detected in the surface wipe samples from the field and training air packs (sample IDs BA-1 and BA-2, respectively). The PCB TEQ maximum result was 1.8x10<sup>-9</sup> μg/cm<sup>2</sup> (training air pack), the non-TEQ PCB maximum result was 2.1x10<sup>-5</sup> μg/cm<sup>2</sup> (field air pack), and the chlorinated dioxin/furan TEQ maximum result was 3.0x10<sup>-8</sup> μg/cm<sup>2</sup> (training air pack).
- Lead was detected on all six surface wipe samples from the training and field air packs (sample IDs ECTC-T-8-A, ECTC-T-38-A, A49996-QUT-185-4-A, A50143-Q-24-5-A, NC50-4-A, AS0421-ENG-21-4-A). The results ranged between 0.013 and 0.048 μg/cm². On the fire hoses, lead was detected on all six surface wipe samples (sample IDs H-01-A, H-02-A, H-03-A, H-04-A, H-05-A, H-06-A). The results ranged between 0.0076 and 0.13 μg/cm².

In the surface wipe samples collected at the Eastern Fire Shop, lead, PCBs, and chlorinated dioxins/furans were detected:

- Lead was detected on all six surface wipe samples collected on various locations of the fire apparatus (sample IDs ENG583-A-1, ENG-558-A-01, ENG159-A-1, ENG-583-A-02, ENG-168-A-01, ENG-558-A-02). The results ranged between 0.030 and 0.54  $\mu$ g/cm<sup>2</sup>.
- PCBs and chlorinated dioxins/furans were detected in the surface wipe samples collected on various locations of the fire apparatus (sample IDs ENG-558-DFP-02, ENG-583-DFP-01, ENG-159-DFP-1, ENG-583-DFP-01, ENG-558-DFP-01). The PCB TEQ maximum result was 5.1x10<sup>-9</sup> μg/cm<sup>2</sup>, the non-TEQ PCB maximum result was 9.4x10<sup>-5</sup> μg/cm<sup>2</sup>, and the chlorinated dioxin/furan TEQ maximum result was 3.0x10<sup>-8</sup> μg/cm<sup>2</sup>, all from sample ID ENG-583-DFP-01 (sampling location: left rear frame at differential).

Of the PBZ air samples collected at the Eastern Fire Shop, the detections included the following:

- Tetrachloroethylene was detected in all six PBZ air samples collected from the fire equipment mechanics, results ranging between 12 and 75 mg/m<sup>3</sup>. All of the measurements were below the Cal/OSHA PEL.
- Cobalt and nickel in welding fumes were detected between two and three orders of magnitude below the Cal/OSHA PEL.
- Diesel particulate as elemental carbon was detected in one PBZ air sample (0.180 mg/m³; sample ID 11405); however, Cal/OSHA has not published a PEL for diesel particulate matter.

The detection of diesel particulate as elemental carbon was the only measured analyte in the eight samples analyzed (six employee PBZ and two area PBZ air samples). Elemental carbon is considered a conservative measure of diesel particulate matter. This result was two orders of magnitude greater than the other sample results. Because elemental carbon is a surrogate for diesel particulate, it is uncertain whether the exposure was caused by diesel emissions or another source of elemental carbon.

Chemicals were not measured in the field blanks above the detection limit or minimum level of quantitation, as applicable to PCBs. The data validation of the analytical data is provided in Attachment 3.

# 7 Next Steps

Task 5 will build on the results of Task 4 and will include calculating the theoretical excess cancer risk from exposure to carcinogenic materials for each SEG determined from Task 2 and toxicity criteria relevant to California risk assessments. The risk assessment will result in an estimate of the increased risk of developing cancer as a result of exposure. This approach involves varying degrees of conservatism, ensuring that cancer risk is not underestimated, which makes it probable that the estimated risk will be overestimated.

For Task 3, Epidemiologic Assessment, employee records are being evaluated for completeness and suitability for a future cancer epidemiology study.

Task 6 may include analyzing public comments, explaining the rationale for specific policy recommendations, and disseminating the study findings to the governor, state legislature, Occupational Safety and Health Standards Board, Los Angeles County Board of Supervisors, and stakeholders in the workers' compensation system.

# 8 References

AIHA (American Industrial Hygiene Association). 2018. Technical guide for wildfire impact assessments for the OEHS professional.

DTSC HERO (California Department of Toxic Substances Control, Human and Ecological Risk Office). 2017. Human health risk assessment (HHRA), Note Number 2. April.

Fent KW, Evans DE, Booher D, Pleil JD, Stiegel MA, Horn GP, Dalton J. 2015. Volatile organic compounds off-gassing from firefighters' personal protective equipment ensembles after use. J Occup Environ Hyg 12(6):404–414, doi:10.1080/15459624.2015.1025135.

Fent KW, LaGuardia M, Luellen D, McCormick S, Mayer A, Chen IC, Kerber S, Smith D, Horn GP. 2020. Flame retardants, dioxins, and furans in air and on firefighters' protective ensembles during controlled residential firefighting. Environ Int 140:105756, doi: https://doi.org/10.1016/j.envint.2020.105756.

IARC (International Agency for Research on Cancer). 2010. IARC Monographs on the evaluation of carcinogenic risks to humans, Volume 98, Painting, firefighting, and shiftwork. Occupational Cancer Research Centre, https://www.occupationalcancer.ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/.

Materna BL, Jones JR, Sutton PM, Rothman N, Harrison RJ. 1992. Occupational exposures in California wildland fire fighting. Am Ind Hyg Assoc J 53(1):69–76, doi:10.1080/15298669291359311.

Park JS, Voss RW, McNeel S, Wu N, Guo T, Wang Y, et al. 2015. High exposure of California firefighters to polybrominated diphenyl ethers. Environ Sci Technol 49(5):2948–2958, doi:10.1021/es5055918.

ToxStrategies, Inc. 2020a. Proposal in response to RFP #4479, Assessment of risk of carcinogens exposure and incidents of occupational cancer among mechanics and cleaners of firefighting vehicles, Volume 1 — Proposal. February 13.

ToxStrategies, Inc. 2020b. Structured literature review of potential occupational exposures and cancer among mechanics who repair and clean firefighting vehicles (Task 1). August 24.

ToxStrategies, Inc. 2020c. Qualitative exposure assessment (Task 2). October 9.

NIOSH (National Institute for Occupation Safety and Health). 1996. Lead in surface wipe samples: Method 9100. NIOSH Manual of Analytical Methods (NMAM), Fourth Edition. Issue 2, May 15.

USEPA (United States Environmental Protection Agency). 2010. Recommended toxicity equivalence factors (TEFs) for human health risk assessments of 2,3,7,8-tetrachlorodibenzo-p-dioxin and dioxin-like compounds. U.S. Environmental Protection Agency, Office of Science Advisor, Risk Assessment Forum. EPA/100/R 10/1005. December.

van den Berg M, Birnbaum LS, Denison M, et al. 2006. Review: The 2005 World Health Organization reevaluation of human and mammalian toxic equivalency factors for dioxins and dioxin-like compounds. Toxicol Sci 93(2):223–241.

# **ATTACHMENT 1**

# **Laboratory Reports**



Report Date: November 09, 2020

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E-mail: s.vivanco@toxstragies.com

Workorder: **34-2031166** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: <b>HM-1103-07</b> |                                             |                     |                      | Collected: 11/03/2020         |
|------------------------------|---------------------------------------------|---------------------|----------------------|-------------------------------|
| Lab ID: 2031166001           | Sar                                         | mpling Location: LA | Received: 11/06/2020 |                               |
| Method: OSHA ID-215          |                                             | Media: PVC Fil      | Instrument: IC08     |                               |
|                              | Sampling Parameter: Air Volume Not Provided |                     |                      | Analyzed: 11/06/2020 (271074) |
|                              | Result                                      |                     |                      |                               |
| Analyte                      | (ug/sample)                                 | Result (ug/m³)      | RL (ug/sample)       |                               |
| Hexavalent Chromium          | < 0.060                                     | NA                  | 0.060                |                               |

| Sample ID: <b>HM-1103-04</b> |                                                        |                     |                      | Collected: 11/03/2020                             |
|------------------------------|--------------------------------------------------------|---------------------|----------------------|---------------------------------------------------|
| Lab ID: 2031166002           | Sar                                                    | mpling Location: LA | Received: 11/06/2020 |                                                   |
| Method: OSHA ID-215          | Media: PVC Filter Sampling Parameter: Air Volume 908 L |                     |                      | Instrument: IC08<br>Analyzed: 11/06/2020 (271074) |
| Analyte                      | Result<br>(ug/sample)                                  | Result (ug/m³)      | RL (ug/sample)       |                                                   |
| Hexavalent Chromium          | <0.060                                                 | <0.066              | 0.060                | <u> </u>                                          |

| Sample ID: <b>HM-1103-11</b> |                                                        |                |                | Collected: 11/03/2020                             |
|------------------------------|--------------------------------------------------------|----------------|----------------|---------------------------------------------------|
| Lab ID: 2031166003           | Sampling Location: LA Fire                             |                |                | Received: 11/06/2020                              |
| Method: OSHA ID-215          | Media: PVC Filter Sampling Parameter: Air Volume 832 L |                |                | Instrument: IC08<br>Analyzed: 11/06/2020 (271074) |
| Analyte                      | Result (ug/sample)                                     | Result (ug/m³) | RL (ug/sample) |                                                   |
| Hexavalent Chromium          | <0.060                                                 | <0.072         | 0.060          |                                                   |

| Sample ID: <b>HM-1103-10</b> |                                      |                |                | Collected: 11/03/2020         |
|------------------------------|--------------------------------------|----------------|----------------|-------------------------------|
| Lab ID: 2031166004           | Sampling Location: LA Fire           |                |                | Received: 11/06/2020          |
| Method: OSHA ID-215          | Media: PVC Filter                    |                |                | Instrument: IC08              |
|                              | Sampling Parameter: Air Volume 770 L |                |                | Analyzed: 11/06/2020 (271074) |
|                              | Result                               |                | , ,            |                               |
| Analyte                      | (ug/sample)                          | Result (ug/m³) | RL (ug/sample) |                               |
| Hexavalent Chromium          | <0.060                               | <0.078         | 0.060          |                               |

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Workorder: **34-2031166** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: <b>HM-1103-02</b> |                                      |                     |                      | Collected: 11/03/2020         |
|------------------------------|--------------------------------------|---------------------|----------------------|-------------------------------|
| Lab ID: 2031166005           | Sar                                  | mpling Location: LA | Received: 11/06/2020 |                               |
| Method: OSHA ID-215          |                                      | Media: PVC Fil      | Instrument: IC08     |                               |
|                              | Sampling Parameter: Air Volume 930 L |                     |                      | Analyzed: 11/06/2020 (271074) |
|                              | Result                               |                     |                      |                               |
| Analyte                      | (ug/sample)                          | Result (ug/m³)      | RL (ug/sample)       |                               |
| Hexavalent Chromium          | <0.060                               | <0.065              | 0.060                |                               |

| Sample ID: <b>HM-1103-12</b> |                                                        |                |                | Collected: 11/03/2020                             |
|------------------------------|--------------------------------------------------------|----------------|----------------|---------------------------------------------------|
| Lab ID: 2031166006           | Sampling Location: LA Fire                             |                |                | Received: 11/06/2020                              |
| Method: OSHA ID-215          | Media: PVC Filter Sampling Parameter: Air Volume 628 L |                |                | Instrument: IC08<br>Analyzed: 11/06/2020 (271074) |
| Analyte                      | Result<br>(ug/sample)                                  | Result (ug/m³) | RL (ug/sample) |                                                   |
| Hexavalent Chromium          | <0.060                                                 | <0.096         | 0.060          |                                                   |

| Sample ID: <b>HM-1103-13</b> |                                                        |                     |                      | Collected: 11/03/2020                             |
|------------------------------|--------------------------------------------------------|---------------------|----------------------|---------------------------------------------------|
| Lab ID: 2031166007           | Sar                                                    | mpling Location: LA | Received: 11/06/2020 |                                                   |
| Method: OSHA ID-215          | Media: PVC Filter Sampling Parameter: Air Volume 744 L |                     |                      | Instrument: IC08<br>Analyzed: 11/06/2020 (271074) |
| Analyte                      | Result (ug/sample)                                     | Result (ug/m³)      | RL (ug/sample)       |                                                   |
| Hexavalent Chromium          | 0.062                                                  | 0.084               | 0.060                |                                                   |

| Sample ID: <b>HM-1103-08</b> |                                      |                |                | Collected: 11/03/2020         |
|------------------------------|--------------------------------------|----------------|----------------|-------------------------------|
| Lab ID: 2031166008           | Sampling Location: LA Fire           |                |                | Received: 11/06/2020          |
| Method: OSHA ID-215          | Media: PVC Filter                    |                |                | Instrument: IC08              |
|                              | Sampling Parameter: Air Volume 852 L |                |                | Analyzed: 11/06/2020 (271074) |
|                              | Result                               |                |                |                               |
| Analyte                      | (ug/sample)                          | Result (ug/m³) | RL (ug/sample) |                               |
| Hexavalent Chromium          | <0.060                               | <0.070         | 0.060          |                               |

| Sample ID: <b>HM-1103-01</b> |                                      |                |                | Collected: 11/03/2020         |
|------------------------------|--------------------------------------|----------------|----------------|-------------------------------|
| Lab ID: 2031166009           | Sampling Location: LA Fire           |                |                | Received: 11/06/2020          |
| Method: OSHA ID-215          | Media: PVC Filter                    |                |                | Instrument: IC08              |
|                              | Sampling Parameter: Air Volume 876 L |                |                | Analyzed: 11/06/2020 (271074) |
| Analyte                      | Result<br>(ug/sample)                | Result (ug/m³) | RL (ug/sample) |                               |
| Hexavalent Chromium          | <0.060                               | <0.068         | 0.060          |                               |

# Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method      | Analyst          | Peer Review            |
|-------------|------------------|------------------------|
| OSHA ID-215 | /S/ Daryka Gress | /S/ Christopher Winter |
| OSHA ID-215 | 11/09/2020 10:26 | 11/09/2020 12:07       |

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Workorder: **34-2031166** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Laboratory Contact Information**

Salt Lake City, Utah 84123

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Web: www.alsslc.com

#### **General Lab Comments**

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                     |
|---------------------|----------------------------------|-----------------------|---------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                       |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                       |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                      |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                           |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                       |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Lab oratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pilabs.com                                                                       |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.

| 2031166 |
|---------|

# **ANALYTICAL REQUEST FORM**

|                                                        |                                                  |                                       | 1. REGULAR S             | tatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  | 103111010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
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| . Company Name : Tox                                   | Strate                                           | gies Tome                             | 4.                       | ALS Project Manager:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Cica             | Helland                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
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| Person to Contact: $\frac{G}{2}$                       |                                                  |                                       |                          | Industrial Process:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Telephone (MM)                                         | 182 -153                                         | 39                                    |                          | Date of Collection 11,63/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Fax Telephone ( )                                      |                                                  |                                       |                          | Time Collected  (Time Collected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| E-mail Address: <u>S V</u>                             | Vanco                                            | @ toxstract                           | egies.com                | Date of Shipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Billing Address (if differe                            | nt from above)                                   | )                                     |                          | Chain of Custody No.:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|                                                        |                                                  |                                       | 6.                       | 6. How did you first learn about ALS?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
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| REQUEST FOR ANALY  Client Sample Number                |                                                  | Cample (Area Meliuma                  | ANALYSES DECLIES         | ED - Use method number if known                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Units**          | Lab Carrents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
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| M-1103-07                                              | <del> </del>                                     | 0.001                                 | 05HA 1D21                | 5 (Hex Chrom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  | 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| 1M-1103-04                                             | PVC                                              | 9081                                  | -                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                | W-1/1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| M-1103-11                                              | PVC                                              | 832L                                  | ((                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| M-1103-10                                              | PVC                                              | 7706                                  | ((                       | (1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| M-1103-02                                              | PVC                                              | 930 [                                 |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 1M-1103-12                                             | PVC                                              | 628 L                                 | ·                        | ((                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5                | Heren was a second of the seco |  |
| M-1103-13                                              | PVC                                              | 744 L                                 | L1                       | A STATE OF THE STA | 2                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| IM-1103-08                                             | PVC                                              | 862 L                                 | ((                       | 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 5                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <u>1M-1103 -01                                    </u> | PVC                                              | 876L                                  | l l                      | ( (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
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| ossible Contamination and                              | d/or Chemical                                    | Hazards                               |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Chain of Custody (Opt                                  | ional)                                           |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| elinquished by Sle                                     | ghom                                             | 10 Manno                              | Da Da                    | te/Time 11/05/207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <u>10</u>        | 5:00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
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Report Date: November 12, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: **34-2031169** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: N18LA-01 Collected: 11/03/2020 Lab ID: 2031169001 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe **Instrument: IC08 Sampling Parameter: Volume Not Provided** Analyzed: 11/11/2020 (271154) Result **Analyte** (ug/sample) RL (ug/sample) Hexavalent Chromium 0.14

Sample ID: N17LA-04 Collected: 11/03/2020 Lab ID: 2031169002 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe Instrument: IC08 **Sampling Parameter: Volume Not Provided** Analyzed: 11/11/2020 (271154) Result **Analyte** (ug/sample) RL (ug/sample) Hexavalent Chromium 0.076 0.060

Sample ID: N18LA-02 Collected: 11/03/2020 Lab ID: 2031169003 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe **Instrument: IC08 Sampling Parameter: Volume Not Provided** Analyzed: 11/11/2020 (271154) Result **Analyte** (ug/sample) RL (ug/sample) Hexavalent Chromium 0.22 0.060

Sample ID: N120LA-01 Collected: 11/03/2020 Lab ID: 2031169004 Sampling Location: LA Fire Received: 11/06/2020 Instrument: IC08 Method: OSHA ID-215 Media: Wipe Analyzed: 11/11/2020 (271154) **Sampling Parameter: Volume Not Provided** Result **Analyte** (ug/sample) RL (ug/sample) Hexavalent Chromium 0.19 0.060

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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Page 1 of 3 Thu, 11/12/20 2:55 PM IHREP-V12.7



Workorder: **34-2031169** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: N14LA-05 Collected: 11/03/2020 Lab ID: 2031169005 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe Instrument: IC08 **Sampling Parameter: Volume Not Provided** Analyzed: 11/11/2020 (271154) Result Analyte (ug/sample) RL (ug/sample) Hexavalent Chromium 8.0 0.060

Sample ID: N120LA-02 Collected: 11/03/2020 Lab ID: 2031169006 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe Instrument: IC08 **Sampling Parameter: Volume Not Provided** Analyzed: 11/11/2020 (271154) Result Analyte (ug/sample) RL (ug/sample) Hexavalent Chromium 0.13 0.060

Sample ID: N17LA-03 Collected: 11/03/2020 Lab ID: 2031169007 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe **Instrument: IC08** Sampling Parameter: Volume Not Provided Analyzed: 11/11/2020 (271154) Result **Analyte** (ug/sample) RL (ug/sample) Hexavalent Chromium 0.060 0.11

Sample ID: N14LA-06 Collected: 11/03/2020 Lab ID: 2031169008 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA ID-215 Media: Wipe Instrument: IC08 **Sampling Parameter: Volume Not Provided** Analyzed: 11/11/2020 (271154) Result RL (ug/sample) **Analyte** (ug/sample) Hexavalent Chromium 54 0.060

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method       | Analyst          | Peer Review      |
|--------------|------------------|------------------|
| 00114 ID 045 | /S/ Daryka Gress | /S/ Thomas Bosch |
| OSHA ID-215  | 11/12/2020 12:10 | 11/12/2020 14:52 |

#### **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700 960 W Levoy Drive Email: alslt.lab@ALSG

960 W Levoy Drive Email: alslt.lab@ALSGlobal.com Salt Lake City, Utah 84123 Web: www.alsslc.com

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Workorder: **34-2031169** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pilabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                     |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pjlabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.



| ₩ 2031169                                                                    | ll I                                    | ANALY HEAL REQ                                                           | DEST FORM                     | 0 0 1 1 1 0  |
|------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------|-------------------------------|--------------|
|                                                                              |                                         | 1. KEGULAR Status                                                        |                               | 205/169      |
|                                                                              |                                         | RUSH Status Requested -                                                  |                               |              |
| ALS                                                                          |                                         | CONTACT ALS SALT LAK                                                     | DATE<br>E PRIOR TO SENDING SA | AMPLES       |
| 2. Date 11/5/2020 Purchas                                                    | se Order No.                            | 4. Quote No.                                                             |                               | 11000        |
| 3. Company Name: TOXST                                                       |                                         | ALS Project N                                                            | Manager: Tessico              | v Helland    |
|                                                                              |                                         | te 260 5. Sample Colle                                                   |                               |              |
| Mission Viel                                                                 | 0, CA 92691                             | Sampling Site                                                            | LA Fire                       |              |
| Person to Contact: Step                                                      | •                                       |                                                                          | cess:                         |              |
| Telephone (94)9 382                                                          |                                         |                                                                          | otion $11/3/20$               | 20           |
| Fax Telephone ( )                                                            |                                         | Time Collecte                                                            | d , ,                         |              |
| E-mail Address: SVIVW                                                        | 100 @ toxstra                           | tegies. Com Date of Shipm                                                | nent                          |              |
| Billing Address (if different from a                                         | •                                       | •                                                                        | ody No.:                      |              |
|                                                                              |                                         | 6. How did you f                                                         | irst learn about ALS?         |              |
|                                                                              |                                         |                                                                          |                               |              |
|                                                                              |                                         |                                                                          |                               |              |
| 7. REQUEST FOR ANALYSES                                                      |                                         |                                                                          |                               |              |
| Client Sample Number Matr                                                    | ix* Sample/Area Volume                  | ANALYSES REQUESTED - Use metho                                           | od number if known Units**    | Lab Comments |
| N18LA-01 950                                                                 | ive -                                   | 05HA1D215 (He                                                            | X Chrom) 1                    |              |
| N17LA-04 "                                                                   | 100000000000000000000000000000000000000 |                                                                          | 1 1                           |              |
| N18LA-02 11                                                                  |                                         | 11                                                                       | " 1                           |              |
| N120LA-01 "                                                                  |                                         | į,                                                                       | 1 1                           |              |
| N14LA-05 "                                                                   |                                         | 11                                                                       | 11. 1                         |              |
| N120LA-02 U                                                                  |                                         | Ų                                                                        | (1 1                          |              |
| N17LA-03 "                                                                   |                                         | Ü                                                                        | " 1                           |              |
| N14LA-06 "                                                                   |                                         | 1,                                                                       | 11 1                          |              |
| A.,                                                                          |                                         |                                                                          |                               |              |
|                                                                              |                                         |                                                                          |                               |              |
|                                                                              | ·                                       |                                                                          |                               |              |
|                                                                              | <u> </u>                                |                                                                          |                               |              |
|                                                                              |                                         |                                                                          |                               |              |
| * Specify: Solid sorbent tube, e.g. ** 1. μg/sample 2. mg/m³ 3. ppr Comments |                                         | I<br>nger solution; Bulk sample; Blood; U<br>(other) Please indicate one |                               |              |
|                                                                              |                                         |                                                                          |                               |              |
| Possible Contamination and/or Cher                                           | mical Hazards                           |                                                                          |                               |              |
| 7. Chain of Custody (Optional)  Relinquished by                              |                                         |                                                                          | 1/05/2020                     | (5:00        |
| Relinquished by                                                              |                                         | Date/Time                                                                | 110312000                     | (3.00        |

Received by

Received by

Relinquished by

0910

Date/Time \_\_\_\_

Date/Time

Date/Time



Report Date: November 13, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: 34-2031177
Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

Sample ID: FM-002 Collected: 11/04/2020 Lab ID: 2031177001 Sampling Location: La Fire Received: 11/06/2020 Method: OSHA ID-215 Media: PVC Filter **Instrument: IC08** Sampling Parameter: Air Volume 778 L Analyzed: 11/11/2020 (271154) Result **Analyte** (ug/sample) Result (ug/m³) RL (ug/sample) Hexavalent Chromium < 0.060 < 0.077 0.060

| Sample ID: FM-003   |                       |                                       |                                                   | Collected: 11/04/2020 |
|---------------------|-----------------------|---------------------------------------|---------------------------------------------------|-----------------------|
| Lab ID: 2031177002  | Sar                   | mpling Location: La                   | Received: 11/06/2020                              |                       |
| Method: OSHA ID-215 | Sampling              | Media: PVC Fil<br>Parameter: Air Volu | Instrument: IC08<br>Analyzed: 11/11/2020 (271154) |                       |
| Analyte             | Result<br>(ug/sample) | Result (ug/m³)                        | RL (ug/sample)                                    |                       |
| Hexavalent Chromium | <0.060                | NA                                    | 0.060                                             |                       |

| Sample ID: FM-001   |                                                        |                     |                      | Collected: 11/04/2020                             |
|---------------------|--------------------------------------------------------|---------------------|----------------------|---------------------------------------------------|
| Lab ID: 2031177003  | Sar                                                    | mpling Location: La | Received: 11/06/2020 |                                                   |
| Method: OSHA ID-215 | Media: PVC Filter Sampling Parameter: Air Volume 586 L |                     |                      | Instrument: IC08<br>Analyzed: 11/11/2020 (271154) |
| Analyte             | Result (ug/sample)                                     | Result (ug/m³)      | RL (ug/sample)       |                                                   |
| Hexavalent Chromium | <0.060                                                 | <0.10               | 0.060                |                                                   |

| Sample ID: MET01             |                                                        |                     | <b>_</b> .     | Collected: 11/04/2020                                                               |
|------------------------------|--------------------------------------------------------|---------------------|----------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031177004           | Sar                                                    | mpling Location: La | Fire           | Received: 11/06/2020                                                                |
| Method: NIOSH 7300 Mod., MCE | Media: MCE Filter Sampling Parameter: Air Volume 782 L |                     |                | Instrument: ICP12<br>Prepared: 11/09/2020 (271134)<br>Analyzed: 11/11/2020 (271312) |
| Analyte                      | Result<br>(ug/sample)                                  | Result (mg/m³)      | RL (ug/sample) |                                                                                     |
| Aluminum                     | 24                                                     | 0.031               | 5.0            |                                                                                     |

#### **Results Continued on Next Page**

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Workorder: **34-2031177** 

Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Lab ID: 2031177004         Sampling Location: La Fire Media: MCE Filter Sampling Parameter: Air Volume 782 L         Received: 11/06/2020         Received: 11/106/2020           Analyte         Result (ug/sample)         Result (mg/m²)         RL (ug/sample)         Prepared: 11/11/2020 (271314) Analyzed: 11/111/2020 (271314) Analyzed: 11/11/2020 (271314) Analyzed: 11/11/2020 (271314) Analyzed: 11/11 | Sample ID: MET01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                     |                      | Collected: 11/04/2020         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------------|----------------------|-------------------------------|
| Analyte         Result (ug/sample)         Result (mg/m³)         RL (ug/sample)         RL (ug/sample)           Arsenic         < 2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Lab ID: 2031177004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Sa      | mpling Location: La | Received: 11/06/2020 |                               |
| Analyte         (ug/sample)         Result (mg/m³)         RL (ug/sample)           Arsenic         <2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Method: NIOSH 7300 Mod., MCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Samplin |                     |                      | Prepared: 11/09/2020 (271134) |
| Arsenic         42.5         <0.0032         2.5           Barium         50         0.064         0.25           Beryllium         <0.013         <0.000016         0.013           Cadmium         <0.075         <0.000096         0.075           Calcium         71         0.091         15           Chromium         <1.3         <0.0016         1.3           Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Molybdenum         <0.38         <0.0004         0.50           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0004         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.00032         0.25           Sodium         28         <0.036         3.8           Tellur                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                     | ,,                   |                               |
| Barium         50         0.064         0.25           Beryllium         <0.013         <0.000016         0.013           Cadmium         <0.075         <0.00096         0.075           Calcium         71         0.091         15           Chromium         <1.3         <0.0016         1.3           Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.0048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0034         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         0.25           Sodium         28         <0.036         3.8           Tellurium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |                     |                      |                               |
| Beryllium         <0.013         <0.00016         0.013           Cadmium         <0.075         <0.00096         0.075           Calcium         71         0.091         15           Chromium         <1.3         <0.0016         1.3           Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molydenum         <0.38         <0.0048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         <0.5           Sodium         28         <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thalli                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | - MILLION CONTROL CONT |         |                     |                      |                               |
| Cadmium         <0.075         <0.00096         0.075           Calcium         71         0.091         15           Chromium         <1.3         <0.0016         1.3           Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molydenum         <0.38         <0.00048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         2.5           Sodium         28         <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                     |                      |                               |
| Calcium         71         0.091         15           Chromium         <1.3         <0.0016         1.3           Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.0048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         <0.25           Sodium         28         <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         <1.1         <0.0014         <0.075           Vanadium <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                     |                      |                               |
| Chromium         <1.3         <0.0016         1.3           Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.0048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         0.25           Sodium         28         <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         <1.1         <0.0014         <0.075           Vanadium         <0.075         <0.00096         <0.075                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                     |                      |                               |
| Cobalt         0.14         0.00018         0.075           Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                     |                      |                               |
| Copper         12         0.015         0.50           Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.0048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         <0.25           Sodium         28         <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         <1.1         <0.0014         <0.075           Vanadium         <0.075         <0.000096         <0.075           Vtrium         <0.0075         <0.000096         <0.075           Zinc         <5.1         <0.00005         <0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                     |                      |                               |
| Iron         770         0.98         5.0           Lead         <0.50         <0.00064         0.50           Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.00048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         0.25           Sodium         28          <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         <1.1         <0.0014         <0.075           Vanadium         <0.075         <0.000096         <0.075           Vitrium         <0.075         <0.000096         <0.075           Zinc         <0.005         <0.000096         <0.075                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | 0.00018             |                      |                               |
| Lead         <0.50         <0.00064         0.50           Lithium         <1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Copper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12      | 0.015               | 0.50                 |                               |
| Lithium         <1.0         <0.0013         1.0           Magnesium         9.2         0.012         1.3           Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.00048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.0032         0.25           Sodium         28         0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         1.1         <0.0014         <0.075           Vanadium         <0.075         <0.00096         <0.075           Yttrium         <0.075         <0.00096         <0.075           Zinc          <0.0065         <0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Iron                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 770     | 0.98                | 5.0                  |                               |
| Magnesium       9.2       0.012       1.3         Manganese       13       0.017       0.13         Molybdenum       <0.38       <0.00048       0.38         Nickel       1.5       0.0019       0.13         Phosphorus       <5.0       <0.0064       5.0         Selenium       <2.5       <0.0032       2.5         Silver       <0.25       <0.00032       0.25         Sodium       28        0.036       3.8         Tellurium       <1.3       <0.0016       1.3         Thallium       <1.3       <0.0016       1.3         Titanium       <1.1       <0.0014       <0.075         Vanadium       <0.075       <0.00096       <0.075         Yttrium       <0.075       <0.00096       <0.075         Zinc       <0.0065       <0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lead                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <0.50   | <0.00064            | 0.50                 |                               |
| Manganese         13         0.017         0.13           Molybdenum         <0.38         <0.00048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.00032         0.25           Sodium         28         <0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         1.1          <0.0014         <0.075           Vanadium         <0.075         <0.00096         <0.075            Yttrium         <0.075         <0.00096         <0.075           Zinc          <0.0065         <0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Lithium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <1.0    | <0.0013             | 1.0                  |                               |
| Molybdenum         <0.38         <0.00048         0.38           Nickel         1.5         0.0019         0.13           Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.00032         0.25           Sodium         28         0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         1.1         0.0014         0.075           Vanadium         <0.075         <0.00096         0.075           Yttrium         <0.075         <0.00096         0.075           Zinc         5.1         0.0065         0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Magnesium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 9.2     | 0.012               | 1.3                  |                               |
| Nickel         1.5         0.0019         0.13           Phosphorus         <5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Manganese                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 13      | 0.017               | 0.13                 |                               |
| Phosphorus         <5.0         <0.0064         5.0           Selenium         <2.5         <0.0032         2.5           Silver         <0.25         <0.00032         0.25           Sodium         28          0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         1.1         0.0014         0.075           Vanadium         <0.075         <0.00096         0.075           Yttrium         <0.075         <0.00096         0.075           Zinc         5.1         0.0065         0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Molybdenum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <0.38   | <0.00048            | 0.38                 |                               |
| Selenium         <2.5         <0.0032         2.5           Silver         <0.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Nickel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1.5     | 0.0019              | 0.13                 |                               |
| Silver         <0.25         <0.00032         0.25           Sodium         28         0.036         3.8           Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3         <0.0016         1.3           Titanium         1.1         0.0014         0.075           Vanadium         <0.075         <0.000096         0.075           Yttrium         <0.075         <0.000096         0.075           Zinc         5.1         0.0065         0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Phosphorus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <5.0    | <0.0064             | 5.0                  |                               |
| Sodium         28         0.036         3.8           Tellurium         <1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Selenium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <2.5    | <0.0032             | 2.5                  |                               |
| Tellurium         <1.3         <0.0016         1.3           Thallium         <1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Silver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <0.25   | < 0.00032           | 0.25                 |                               |
| Thallium         <1.3         <0.0016         1.3           Titanium         1.1         0.0014         0.075           Vanadium         <0.075         <0.000096         0.075           Yttrium         <0.075         <0.00096         0.075           Zinc         5.1         0.0065         0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sodium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 28      | 0.036               | 3.8                  |                               |
| Titanium         1.1         0.0014         0.075           Vanadium         <0.075                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tellurium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <1.3    | <0.0016             | 1.3                  |                               |
| Vanadium         <0.075         <0.00096         0.075           Yttrium         <0.075                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Thallium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <1.3    | <0.0016             | 1.3                  |                               |
| Yttrium         <0.075         <0.00096         0.075           Zinc         5.1         0.0065         0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Titanium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.1     | 0.0014              | 0.075                |                               |
| Zinc <b>5.1 0.0065</b> 0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Vanadium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <0.075  | < 0.000096          | 0.075                |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Yttrium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <0.075  | <0.000096           | 0.075                |                               |
| Zirconium <0.50 <0.00064 0.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Zinc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5.1     | 0.0065              | 0.50                 |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Zirconium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <0.50   | <0.00064            | 0.50                 |                               |

| Sample ID: MET02             |                                                        |                     |                | Collected: 11/04/2020                                                               |
|------------------------------|--------------------------------------------------------|---------------------|----------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031177005           | Sai                                                    | mpling Location: La | Fire           | Received: 11/06/2020                                                                |
| Method: NIOSH 7300 Mod., MCE | Media: MCE Filter Sampling Parameter: Air Volume 588 L |                     |                | Instrument: ICP12<br>Prepared: 11/09/2020 (271134)<br>Analyzed: 11/11/2020 (271312) |
| Analyte                      | Result<br>(ug/sample)                                  | Result (mg/m³)      | RL (ug/sample) |                                                                                     |
| Aluminum                     | 40                                                     | 0.068               | 5.0            |                                                                                     |
| Arsenic                      | <2.5                                                   | < 0.0043            | 2.5            |                                                                                     |
| Barium                       | 1.6                                                    | 0.0027              | 0.25           |                                                                                     |
| Beryllium                    | <0.013                                                 | <0.000021           | 0.013          |                                                                                     |

#### **Results Continued on Next Page**



Workorder: **34-2031177** 

Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: MET02             |                                                        |                |                                                  | Collected: 11/04/2020 |                                                                                     |
|------------------------------|--------------------------------------------------------|----------------|--------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031177005           | Sampling Location: La Fire                             |                |                                                  | Received: 11/06/2020  |                                                                                     |
| Method: NIOSH 7300 Mod., MCE | Media: MCE Filter Sampling Parameter: Air Volume 588 L |                | Sampling Parameter: Air Volume 588 L Prepared: 1 |                       | Instrument: ICP12<br>Prepared: 11/09/2020 (271134)<br>Analyzed: 11/11/2020 (271312) |
| Analyte                      | Result<br>(ug/sample)                                  | Result (mg/m³) | RL (ug/sample)                                   |                       |                                                                                     |
| Cadmium                      | <0.075                                                 | <0.00013       | 0.075                                            |                       |                                                                                     |
| Calcium                      | <15                                                    | <0.026         | 15                                               |                       |                                                                                     |
| Chromium                     | <1.3                                                   | < 0.0021       | 1.3                                              |                       |                                                                                     |
| Cobalt                       | <0.075                                                 | <0.00013       | 0.075                                            |                       |                                                                                     |
| Copper                       | 1.4                                                    | 0.0025         | 0.50                                             |                       |                                                                                     |
| Iron                         | 130                                                    | 0.23           | 5.0                                              |                       |                                                                                     |
| Lead                         | <0.50                                                  | <0.00085       | 0.50                                             |                       |                                                                                     |
| Lithium                      | <1.0                                                   | <0.0017        | 1.0                                              |                       |                                                                                     |
| Magnesium                    | 2.2                                                    | 0.0038         | 1.3                                              |                       |                                                                                     |
| Manganese                    | 9.2                                                    | 0.016          | 0.13                                             |                       |                                                                                     |
| Molybdenum                   | <0.38                                                  | <0.00064       | 0.38                                             |                       |                                                                                     |
| Nickel                       | 0.30                                                   | 0.00052        | 0.13                                             |                       |                                                                                     |
| Phosphorus                   | <5.0                                                   | <0.0085        | 5.0                                              |                       |                                                                                     |
| Selenium                     | <2.5                                                   | <0.0043        | 2.5                                              |                       |                                                                                     |
| Silver                       | <0.25                                                  | <0.00043       | 0.25                                             |                       |                                                                                     |
| Sodium                       | 18                                                     | 0.031          | 3.8                                              |                       |                                                                                     |
| Tellurium                    | <1.3                                                   | <0.0021        | 1.3                                              |                       |                                                                                     |
| Thallium                     | <1.3                                                   | <0.0021        | 1.3                                              |                       |                                                                                     |
| Titanium                     | 2.0                                                    | 0.0034         | 0.075                                            |                       |                                                                                     |
| Vanadium                     | <0.075                                                 | <0.00013       | 0.075                                            |                       |                                                                                     |
| Yttrium                      | <0.075                                                 | <0.00013       | 0.075                                            |                       |                                                                                     |
| Zinc                         | 150                                                    | 0.25           | 0.50                                             |                       |                                                                                     |
| Zirconium                    | < 0.50                                                 | <0.00085       | 0.50                                             |                       |                                                                                     |

| Sample ID: MET03             |                                                               |                     |                | Collected: 11/04/2020                                                               |
|------------------------------|---------------------------------------------------------------|---------------------|----------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031177006           | Sa                                                            | mpling Location: La | Fire           | Received: 11/06/2020                                                                |
| Method: NIOSH 7300 Mod., MCE | Media: MCE Filter Sampling Parameter: Air Volume Not Provided |                     |                | Instrument: ICP12<br>Prepared: 11/09/2020 (271134)<br>Analyzed: 11/11/2020 (271312) |
| Analyte                      | Result<br>(ug/sample)                                         | Result (mg/m³)      | RL (ug/sample) |                                                                                     |
| Aluminum                     | <5.0                                                          | NA                  | 5.0            |                                                                                     |
| Arsenic                      | <2.5                                                          | NA                  | 2.5            |                                                                                     |
| Barium                       | <0.25                                                         | NA                  | 0.25           |                                                                                     |
| Beryllium                    | <0.013                                                        | NA                  | 0.013          |                                                                                     |
| Cadmium                      | <0.075                                                        | NA                  | 0.075          |                                                                                     |
| Calcium                      | <15                                                           | NA                  | 15             |                                                                                     |
| Chromium                     | <1.3                                                          | NA                  | 1.3            |                                                                                     |

#### **Results Continued on Next Page**



Workorder: **34-2031177**Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: MET03             |                            |                                         |                | Collected: 11/04/2020                                                               |
|------------------------------|----------------------------|-----------------------------------------|----------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031177006           | Sampling Location: La Fire |                                         |                | Received: 11/06/2020                                                                |
| Method: NIOSH 7300 Mod., MCE | Samplin                    | Media: MCE Fil<br>g Parameter: Air Volu |                | Instrument: ICP12<br>Prepared: 11/09/2020 (271134)<br>Analyzed: 11/11/2020 (271312) |
| Analyte                      | Result<br>(ug/sample)      | Result (mg/m³)                          | RL (ug/sample) |                                                                                     |
| Cobalt                       | <0.075                     | NA                                      | 0.075          |                                                                                     |
| Copper                       | <0.50                      | NA                                      | 0.50           |                                                                                     |
| Iron                         | <5.0                       | NA                                      | 5.0            |                                                                                     |
| Lead                         | <0.50                      | NA                                      | 0.50           |                                                                                     |
| Lithium                      | <1.0                       | NA                                      | 1.0            |                                                                                     |
| Magnesium                    | <1.3                       | NA                                      | 1.3            |                                                                                     |
| Manganese                    | <0.13                      | NA                                      | 0.13           |                                                                                     |
| Molybdenum                   | <0.38                      | NA                                      | 0.38           |                                                                                     |
| Nickel                       | <0.13                      | NA                                      | 0.13           |                                                                                     |
| Phosphorus                   | <5.0                       | NA                                      | 5.0            |                                                                                     |
| Selenium                     | <2.5                       | NA                                      | 2.5            |                                                                                     |
| Silver                       | <0.25                      | NA                                      | 0.25           |                                                                                     |
| Sodium                       | <3.8                       | NA                                      | 3.8            |                                                                                     |
| Tellurium                    | <1.3                       | NA                                      | 1.3            |                                                                                     |
| Thallium                     | <1.3                       | NA                                      | 1.3            |                                                                                     |
| Titanium                     | <0.075                     | NA                                      | 0.075          |                                                                                     |
| Vanadium                     | <0.075                     | NA                                      | 0.075          |                                                                                     |
| Yttrium                      | <0.075                     | NA                                      | 0.075          |                                                                                     |
| Zinc                         | <0.50                      | NA                                      | 0.50           |                                                                                     |
| Zirconium                    | < 0.50                     | NA                                      | 0.50           |                                                                                     |

| Sample ID: #1           |             |                                          | Collected: 11/04/2020                               |
|-------------------------|-------------|------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031177007      | Sampli      | ng Location: La Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 9002 Mod. | Sampling Pa | Media: Bulk rameter: Volume Not Provided | Instrument: MSCP04<br>Analyzed: 11/13/2020 (271373) |
| Analyte                 | Result (%)  | RL (%)                                   |                                                     |
| Chrysotile              | ND          | 1.0                                      |                                                     |
| Amosite                 | ND          | 1.0                                      |                                                     |
| Crocidolite             | ND          | 1.0                                      |                                                     |
| Actinolite/Tremolite    | ND          | 1.0                                      |                                                     |
| Anthophyllite           | ND          | 1.0                                      |                                                     |



Workorder: **34-2031177**Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: <b>#2</b><br>Lab ID: 2031177008 | Sampli      | ing Location: La Fire                    | Collected: 11/04/2020<br>Received: 11/06/2020       |
|--------------------------------------------|-------------|------------------------------------------|-----------------------------------------------------|
| Method: NIOSH 9002 Mod.                    | Sampling Pa | Media: Bulk rameter: Volume Not Provided | Instrument: MSCP04<br>Analyzed: 11/13/2020 (271373) |
| Analyte                                    | Result (%)  | RL (%)                                   |                                                     |
| Chrysotile                                 | ND          | 1.0                                      |                                                     |
| Amosite                                    | ND          | 1.0                                      |                                                     |
| Crocidolite                                | ND          | 1.0                                      |                                                     |
| Actinolite/Tremolite                       | ND          | 1.0                                      |                                                     |
| Anthophyllite                              | ND          | 1.0                                      |                                                     |

| Sample ID: #3           |             |                                          | Collected: 11/04/2020                               |
|-------------------------|-------------|------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031177009      | Sampli      | ng Location: La Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 9002 Mod. | Sampling Pa | Media: Bulk rameter: Volume Not Provided | Instrument: MSCP04<br>Analyzed: 11/13/2020 (271373) |
| Analyte                 | Result (%)  | RL (%)                                   |                                                     |
| Chrysotile              | ND          | 1.0                                      |                                                     |
| Amosite                 | ND          | 1.0                                      |                                                     |
| Crocidolite             | ND          | 1.0                                      |                                                     |
| Actinolite/Tremolite    | ND          | 1.0                                      |                                                     |
| Anthophyllite           | ND          | 1.0                                      |                                                     |

| Sample ID: #4           |             |                                          | Collected: 11/04/2020                               |
|-------------------------|-------------|------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031177010      | Sampli      | ng Location: La Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 9002 Mod. | Sampling Pa | Media: Bulk rameter: Volume Not Provided | Instrument: MSCP04<br>Analyzed: 11/13/2020 (271373) |
| Analyte                 | Result (%)  | RL (%)                                   |                                                     |
| Chrysotile              | ND          | 1.0                                      |                                                     |
| Amosite                 | ND          | 1.0                                      |                                                     |
| Crocidolite             | ND          | 1.0                                      |                                                     |
| Actinolite/Tremolite    | ND          | 1.0                                      |                                                     |
| Anthophyllite           | ND          | 1.0                                      |                                                     |

## **Report Authorization** (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method               | Analyst                                   | Peer Review                               |
|----------------------|-------------------------------------------|-------------------------------------------|
| NIOSH 7300 Mod., MCE | /S/ Joanna C. Sanchez<br>11/11/2020 16:05 | /S/ Kristie F. Bitner<br>11/12/2020 10:10 |
|                      | /S/ Chandler Griffith                     | /S/ Peter P. Steen                        |
| NIOSH 9002 Mod.      | 11/13/2020 15:03                          | 11/13/2020 15:12                          |
| OSHA ID-215          | /S/ Daryka Gress                          | /S/ Thomas Bosch                          |
| OSHA ID-213          | 11/12/2020 12:10                          | 11/12/2020 14:52                          |



Workorder: **34-2031177** 

Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

#### **Laboratory Contact Information**

**ALS Environmental** Phone: (801) 266-7700

960 W Levoy Drive Email: alslt.lab@ALSGlobal.com Salt Lake City, Utah 84123

Web: www.alsslc.com

#### **General Lab Comments**

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                     |
|---------------------|----------------------------------|-----------------------|---------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                       |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                       |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                      |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                           |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                       |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Lab oratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pilabs.com                                                                       |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.

# W

**ANALYTICAL REQUEST FORM** 

| ₩ 20311 <sup>-</sup>                   | 77                  |                                         | ANALTHCAL REQUEST FOR                                              | .IVI         | 1172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|---------------------|-----------------------------------------|--------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        |                     |                                         | 1. REGULAR Status                                                  | 800          | 1177                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                        |                     |                                         | RUSH Status Requested - ADDITIONAL CHARLES RESULTS REQUIRED BYDATE | \RGE         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| AL                                     | S)                  |                                         | CONTACT ALS SALT LAKE PRIOR TO SENI                                | DING SAMPLES |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2. Date 11/05/202                      | Purchase Ord        | der No.                                 | <b>4.</b> Quote No                                                 |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3. Company Name :                      | oxstrad             | regies                                  | ALS Project Manager:                                               | telland      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Address: 2700)                         | Lapa                | IZ Rd Suit                              | 5. Sample Collection                                               | ,            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>Mission i</u>                       | Liero               | CA 9269                                 | Sampling Site L.A.                                                 | fire         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Person to Contact:                     | , La                | ч                                       |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Telephone (149)                        |                     | 4                                       | Date of Collection                                                 | 12020        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Fax Telephone ( )                      |                     |                                         | Time Collected                                                     |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        | $\overline{\alpha}$ | artoxstra                               | Pegies, Compate of Shipment                                        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Billing Address (if different          |                     |                                         | Chain of Custody No.:                                              |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Dilling Address (if differen           | THE HOITH GLOVE     | ,                                       | 6. How did you first learn about ALS                               |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ************************************** |                     |                                         | o. How did you mot loan about hee                                  | <b>.</b> .   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7. REQUEST FOR ANALY                   | T                   |                                         | T                                                                  | <u> </u>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Client Sample Number                   | Matrix*             | Sample/Area Volume                      | ANALYSES REQUESTED - Use method number if known                    |              | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| FM-002 1                               | PVC                 | 778 L                                   | OSHAID ZIS - HEX Chrom                                             |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FM-0031                                | PVC                 |                                         | OSHAIDZIS HEX Chrome                                               |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FM-001"                                | PVC                 | 5866                                    | OSHA ID215-Hex Chrome                                              | 5            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| METOL 0                                | MCE                 | 7821                                    | NIOSH 7300/7303 Welding from                                       | 5            | ····                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| METOZ!                                 | MCE                 | 288F                                    | MOSH7300/7303 "                                                    | 5            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| METOS:                                 | MCE_                |                                         | MOSH 7300/7303 "                                                   | 1            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 41,                                    | DUIK                |                                         | NIOSH 9002 - Aspertos                                              | 1            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| #2,                                    | bulk                |                                         | NIOSH 9002-Aspertus                                                | 1            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| #3                                     | bulk                |                                         | NIOSH 9002 - Asbestus                                              | ,            | Name of the second seco |
| 441                                    | bulk                |                                         | NIOSH 9002 - Aspestus                                              |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     | •                                       |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| * Specify: Solid corbont to            | ubo o a Char        | coal: Filter type: Impi                 |                                                                    | Mater: Other |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         | (other) Please indicate one or more units in the                   |              | nits**                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Comments                               | ,,                  |                                         |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     | *************************************** |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Possible Contamination an              |                     | Hazards                                 |                                                                    |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7. Chain of Custody (Opt               | TONAI)              | $\overline{}$                           | 11/00/2                                                            | 20 1x 1/1    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Relinquished by                        |                     | Aronom .                                | Date/Time 11/05/10                                                 | 20 150       | <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Received by JU                         | ww                  | gersey                                  | Date/Time                                                          | 10 (GB): "   | 770                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Relinquished by                        |                     |                                         | Date/Time                                                          |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        |                     |                                         |                                                                    |              | _                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Received by

Date/Time



#### Amended-20201216

Report Date: December 16, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: **34-2031255** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: N120LA-03-A Collected: 11/03/2020 Lab ID: 2031255001 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 9102 Mod, Ghost Wipe Media: Wipe **Instrument: ICP13 Sampling Parameter: Volume Not Provided** Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) Result **Analyte** (ug/sample) RL (ug/sample) Arsenic <6.3 6.3 Lead 0.50 1.6

| Sample ID: N190LA-01-A            |                       |                                                  | Collected: 11/03/2020                                                         |
|-----------------------------------|-----------------------|--------------------------------------------------|-------------------------------------------------------------------------------|
| Lab ID: 2031255002                | Sa                    | ampling Location: LA Fire                        | Received: 11/06/2020                                                          |
| Method: NIOSH 9102 Mod, Ghost Wip |                       | Media: Wipe<br>ng Parameter: Volume Not Provided | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte                           | Result<br>(ug/sample) | RL (ug/sample)                                   |                                                                               |
| Arsenic                           | <6.3                  | 6.3                                              |                                                                               |
| Lead                              | 1.9                   | 0.50                                             |                                                                               |

| Sample ID: N822LA-03-A             |           |                                                  | Collected: 11/03/2020                                                               |
|------------------------------------|-----------|--------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031255003                 | Sa        | ampling Location: LA Fire                        | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin   | Media: Wipe<br>ng Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
|                                    | Result    |                                                  |                                                                                     |
| Analyte (ug                        | g/sample) | RL (ug/sample)                                   |                                                                                     |
| Arsenic                            | <6.3      | 6.3                                              |                                                                                     |
| Lead                               | 0.91      | 0.50                                             |                                                                                     |

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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# Amended-20201216

Workorder: **34-2031255** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: N120LA-01-A             |             |                                          | Collected: 11/03/2020                                                               |
|------------------------------------|-------------|------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031255004                 | S           | Sampling Location: LA Fire               | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe |             | Media: Wipe ng Parameter: Volume Not Pro | vided Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
|                                    | Result      |                                          |                                                                                     |
| Analyte                            | (ug/sample) | RL (ug/sample)                           |                                                                                     |
| Arsenic                            | <6.3        | 6.3                                      |                                                                                     |
| Lead                               | 0.82        | 0.50                                     |                                                                                     |

| Sample ID: N120LA-02-A             |                      |                                                 | Collected: 11/03/2020                                                               |
|------------------------------------|----------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031255005                 | Sa                   | ampling Location: LA Fire                       | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe |                      | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (                          | Result<br>ug/sample) | RL (ug/sample)                                  |                                                                                     |
| Arsenic                            | <6.3                 | 6.3                                             |                                                                                     |
| Lead                               | 1.6                  | 0.50                                            |                                                                                     |

| Sample ID: HM-Blank-Arsenic<br>Lab ID: 2031255006 | Sa                   | ampling Location: LA Fire                    | Collected: 11/03/2020<br>Received: 11/06/2020                                 |
|---------------------------------------------------|----------------------|----------------------------------------------|-------------------------------------------------------------------------------|
| Method: NIOSH 9102 Mod, Ghost Wipe                | Samplir              | Media: Wipe ng Parameter: Volume Not Applica | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte (r                                        | Result<br>ug/sample) | RL (ug/sample)                               |                                                                               |
| Arsenic                                           | <6.3                 | 6.3                                          |                                                                               |
| Lead                                              | <0.50                | 0.50                                         |                                                                               |

| Sample ID: N822LA-01-A             |                                                     |                           | Collected: 11/03/2020                                                         |
|------------------------------------|-----------------------------------------------------|---------------------------|-------------------------------------------------------------------------------|
| Lab ID: 2031255007                 | S                                                   | ampling Location: LA Fire | Received: 11/06/2020                                                          |
| Method: NIOSH 9102 Mod, Ghost Wipe | Media: Wipe Sampling Parameter: Volume Not Provided |                           | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte (ug                        | Result<br>y/sample)                                 | RL (ug/sample)            |                                                                               |
| Arsenic                            | <6.3                                                | 6.3                       |                                                                               |
| Lead                               | <0.50                                               | 0.50                      |                                                                               |

Page 2 of 5 Wed, 12/16/20 11:40 AM IHREP-V12.7



# Amended-20201216

Workorder: **34-2031255** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: <b>N190LA-02-A</b> Lab ID: 2031255008 | Sa                 | ampling Location: LA Fire                       | Collected: 11/03/2020<br>Received: 11/06/2020                                       |
|--------------------------------------------------|--------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| Method: NIOSH 9102 Mod, Ghost Wipe               |                    | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte                                          | Result (ug/sample) | RL (ug/sample)                                  |                                                                                     |
| Arsenic                                          | <6.3               | 6.3                                             |                                                                                     |
| Lead                                             | <0.50              | 0.50                                            |                                                                                     |

| Sample ID: N14LA-02-A              |                      |                                                 | Collected: 11/03/2020                                                               |
|------------------------------------|----------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031255009                 | Sa                   | ampling Location: LA Fire                       | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin              | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result<br>ug/sample) | RL (ug/sample)                                  |                                                                                     |
| Arsenic                            | <6.3                 | 6.3                                             |                                                                                     |
| Lead                               | 2.3                  | 0.50                                            |                                                                                     |

| Sample ID: N14LA-01-A              |                      |                                            | Collected: 11/03/2020                                                               |
|------------------------------------|----------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031255010                 | Sa                   | impling Location: LA Fire                  | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin              | Media: Wipe<br>g Parameter: Volume Not Pro | vided Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result<br>ig/sample) | RL (ug/sample)                             |                                                                                     |
| Arsenic                            | <6.3                 | 6.3                                        |                                                                                     |
| Lead                               | 2.8                  | 0.50                                       |                                                                                     |

| Sample ID: N822LA-02-A             |                     |                                                 | Collected: 11/03/2020                                                               |
|------------------------------------|---------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031255011                 | Sa                  | ampling Location: LA Fire                       | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin             | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result<br>g/sample) | RL (ug/sample)                                  |                                                                                     |
| Arsenic                            | <6.3                | 6.3                                             |                                                                                     |
| Lead                               | 0.85                | 0.50                                            |                                                                                     |

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#### Amended-20201216

Workorder: **34-2031255** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: N190LA-03-A Collected: 11/03/2020 Lab ID: 2031255012 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 9102 Mod, Ghost Wipe Media: Wipe **Instrument: ICP13 Sampling Parameter: Volume Not Provided** Prepared: 11/09/2020 (271142) **Analyzed:** 11/11/2020 (271304) Result **Analyte** (ug/sample) RL (ug/sample) Arsenic <6.3 Lead 2.3 0.50

| Sample ID: N14LA-03-A              |                  |                                               | Collected: 11/03/2020                                                           |
|------------------------------------|------------------|-----------------------------------------------|---------------------------------------------------------------------------------|
| Lab ID: 2031255013                 | 9                | Sampling Location: LA Fire                    | Received: 11/06/2020                                                            |
| Method: NIOSH 9102 Mod, Ghost Wipe | Sampl            | Media: Wipe ing Parameter: Volume Not Provide | Instrument: ICP13 d Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result g/sample) | RL (ug/sample)                                |                                                                                 |
|                                    | •                |                                               |                                                                                 |
| Arsenic                            | <6.3             | 6.3                                           |                                                                                 |
| Lead                               | 3.3              | 0.50                                          |                                                                                 |

#### Comments

Workorder: 2031255

Amended(12/16/2020): Report amended to include lead data per client request.

# Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method                     | Analyst                                | Peer Review                        |  |
|----------------------------|----------------------------------------|------------------------------------|--|
| NIOSH 9102 Mod, Ghost Wipe | /S/ Peter P. Steen<br>12/16/2020 09:27 | /S/ Rex Bagley<br>11/11/2020 15:17 |  |

#### **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive Salt Lake City, Utah 84123 Phone: (801) 266-7700

Email: alslt.lab@ALSGlobal.com

Web: www.alsslc.com

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#### Amended-20201216

Workorder: **34-2031255** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)       | Certificate<br>Number | Website                                                                                    |
|---------------------|-------------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)<br>PJLA (ISO 17025) | L20-57<br>L20-58      | http://www.pjlabs.com<br>http://www.pjlabs.com                                             |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP)    | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                           | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                          | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                    | L20-58                | http://www.pjlabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- ( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.



# **ANALYTICAL REQUEST FORM**

| A  |   | <b>A</b> |
|----|---|----------|
| (A | 5 | )        |

1. REGULAR Status

|                                      | RUSH Status Requested - ADDITIONAL CHARGE RESULTS REQUIRED BY |          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| N822LA-03-A                          | 6                                                             |          | •                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| N120LA-01-A                          | ,                                                             |          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| N120LA-02-A1                         |                                                               |          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| N190LA-02-A                          | 0                                                             | <u> </u> |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| NI4LA-02-A1                          |                                                               |          | ,                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| N14LA-01-A                           | ŧ                                                             |          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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#### Amended-20201216

Report Date: December 16, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: 34-2031257
Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

Sample ID: ECTC-T-8-A Collected: 11/03/2020 Lab ID: 2031257001 Received: 11/06/2020 Sampling Location: La Fire Method: NIOSH 9102 Mod, Ghost Wipe Media: Ghost Wipe **Instrument: ICP13 Sampling Parameter: Area Not Provided** Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) Result **Analyte** (ug/sample) RL (ug/sample) Arsenic <6.3 6.3 Lead 1.7 0.50

| Sample ID: ECTC-T-38-A             |                      |                                                     | Collected: 11/03/2020                                                               |
|------------------------------------|----------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031257002                 | Sa                   | mpling Location: La Fire                            | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin              | Media: Ghost Wipe<br>g Parameter: Area Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result<br>ug/sample) | RL (ug/sample)                                      |                                                                                     |
| Arsenic                            | <6.3                 | 6.3                                                 |                                                                                     |
| Lead                               | 1.6                  | 0.50                                                |                                                                                     |

| Sample ID: <b>A49996-QUT-185-4-A</b> |           |                                                   | Collected: 11/03/2020                                                               |
|--------------------------------------|-----------|---------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031257003                   | Sa        | ampling Location: La Fire                         | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe   | Samplir   | Media: Ghost Wipe ng Parameter: Area Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
|                                      | Result    |                                                   |                                                                                     |
| Analyte (ug                          | ı/sample) | RL (ug/sample)                                    |                                                                                     |
| Arsenic                              | <6.3      | 6.3                                               |                                                                                     |
| Lead                                 | 1.4       | 0.50                                              |                                                                                     |

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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RIGHT SOLUTIONS RIGHT PARTNER

Page 1 of 5 Wed, 12/16/20 11:41 AM IHREP-V12.7



#### Amended-20201216

Workorder: 34-2031257
Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: A50143-Q-24-5-A Collected: 11/03/2020 Sampling Location: La Fire Lab ID: 2031257004 Received: 11/06/2020 Method: NIOSH 9102 Mod, Ghost Wipe **Instrument: ICP13** Media: Ghost Wipe **Sampling Parameter: Area Not Provided** Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) Result (ug/sample) **Analyte** RL (ug/sample) Arsenic <6.3 6.3 Lead 1.3 0.50

Sample ID: NC50-4-A Collected: 11/03/2020 Lab ID: 2031257005 Sampling Location: La Fire Received: 11/06/2020 Media: Ghost Wipe Instrument: ICP13 Method: NIOSH 9102 Mod, Ghost Wipe Prepared: 11/09/2020 (271142) **Sampling Parameter: Area Not Provided** Analyzed: 11/11/2020 (271304) Result **Analyte** (ug/sample) RL (ug/sample) Arsenic <6.3 6.3 Lead 2.7 0.50

Sample ID: AS0421-ENG-21-4-A Collected: 11/03/2020 Lab ID: 2031257006 Sampling Location: La Fire Received: 11/06/2020 Method: NIOSH 9102 Mod, Ghost Wipe Media: Ghost Wipe Instrument: ICP13 Sampling Parameter: Area Not Provided Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) Result **Analyte** (ug/sample) RL (ug/sample) Arsenic <6.3 6.3 Lead 4.8 0.50

Sample ID: A-BLANK Collected: 11/03/2020 Lab ID: 2031257007 Received: 11/06/2020 Sampling Location: La Fire Method: NIOSH 9102 Mod, Ghost Wipe Media: Ghost Wipe **Instrument: ICP13** Prepared: 11/09/2020 (271142) Sampling Parameter: Area Not Applicable Analyzed: 11/11/2020 (271304) Result **Analyte** RL (ug/sample) (ug/sample) Arsenic <6.3 6.3 Lead < 0.50 0.50



# Amended-20201216

Workorder: **34-2031257** 

Client Project ID: La Fire 110320 Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: <b>H-01-A</b> Lab ID: 2031257008 | S                   | ampling Location: La Fire                         | Collected: 11/03/2020<br>Received: 11/06/2020                                       |
|---------------------------------------------|---------------------|---------------------------------------------------|-------------------------------------------------------------------------------------|
| Method: NIOSH 9102 Mod, Ghost Wipe          | Samplii             | Media: Ghost Wipe ng Parameter: Area Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (ug                                 | Result<br>y/sample) | RL (ug/sample)                                    |                                                                                     |
| Arsenic                                     | <6.3                | 6.3                                               |                                                                                     |
| Lead                                        | 0.88                | 0.50                                              |                                                                                     |

| Sample ID: H-02-A                  |                      |                                                     | Collected: 11/03/2020                                                               |
|------------------------------------|----------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031257009                 | Sa                   | mpling Location: La Fire                            | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin              | Media: Ghost Wipe<br>g Parameter: Area Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result<br>ig/sample) | RL (ug/sample)                                      |                                                                                     |
| Arsenic                            | <6.3                 | 6.3                                                 |                                                                                     |
| Lead                               | 0.95                 | 0.50                                                |                                                                                     |

| Sample ID: H-03-A                  |                      |                                                     | Collected: 11/03/2020                                                               |
|------------------------------------|----------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031257010                 | Sa                   | mpling Location: La Fire                            | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin              | Media: Ghost Wipe<br>g Parameter: Area Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte (u                         | Result<br>ig/sample) | RL (ug/sample)                                      |                                                                                     |
| Arsenic                            | <6.3                 | 6.3                                                 |                                                                                     |
| Lead                               | 0.76                 | 0.50                                                |                                                                                     |

| Sample ID: <b>H-04-A</b>           |           |                                                     | Collected: 11/03/2020                                                         |
|------------------------------------|-----------|-----------------------------------------------------|-------------------------------------------------------------------------------|
| Lab ID: 2031257011                 | Sa        | ampling Location: La Fire                           | Received: 11/06/2020                                                          |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin   | Media: Ghost Wipe<br>g Parameter: Area Not Provided | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
|                                    | Result    |                                                     |                                                                               |
| Analyte (u                         | g/sample) | RL (ug/sample)                                      |                                                                               |
| Arsenic                            | <6.3      | 6.3                                                 |                                                                               |
| Lead                               | 2.5       | 0.50                                                |                                                                               |

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#### Amended-20201216

Workorder: 34-2031257
Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: H-05-A Collected: 11/03/2020 Lab ID: 2031257012 Sampling Location: La Fire Received: 11/06/2020 Method: NIOSH 9102 Mod, Ghost Wipe Media: Ghost Wipe **Instrument: ICP13 Sampling Parameter: Area Not Provided** Prepared: 11/09/2020 (271142) **Analyzed:** 11/11/2020 (271304) Result **Analyte** RL (ug/sample) (ug/sample) Arsenic <6.3 Lead 0.50 13

| Sample ID: H-06-A                  |            |                                                    | Collected: 11/03/2020                                                         |
|------------------------------------|------------|----------------------------------------------------|-------------------------------------------------------------------------------|
| Lab ID: 2031257013                 | S          | Sampling Location: La Fire                         | Received: 11/06/2020                                                          |
| Method: NIOSH 9102 Mod, Ghost Wipe | Sampli     | Media: Ghost Wipe ing Parameter: Area Not Provided | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
|                                    | Result     |                                                    |                                                                               |
| Analyte (u                         | ıg/sample) | RL (ug/sample)                                     |                                                                               |
| Arsenic                            | <6.3       | 6.3                                                |                                                                               |
| Lead                               | 5.6        | 0.50                                               |                                                                               |

#### Comments

Workorder: 2031257

Amended(12/16/2020): Report amended to include lead data per client request.

# Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method                     | Analyst                                | Peer Review                        |  |
|----------------------------|----------------------------------------|------------------------------------|--|
| NIOSH 9102 Mod, Ghost Wipe | /S/ Peter P. Steen<br>12/16/2020 09:27 | /S/ Rex Bagley<br>11/11/2020 15:17 |  |

#### **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive Salt Lake City, Utah 84123 Phone: (801) 266-7700

Email: alslt.lab@ALSGlobal.com

Web: www.alsslc.com

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#### Amended-20201216

Workorder: **34-2031257** 

Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

#### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)       | Certificate<br>Number | Website                                                                                    |
|---------------------|-------------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)<br>PJLA (ISO 17025) | L20-57<br>L20-58      | http://www.pjlabs.com<br>http://www.pjlabs.com                                             |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP)    | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                           | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                          | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                    | L20-58                | http://www.pjlabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- ( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.

Ayaa

# **ANALYTICAL REQUEST FORM**

|                                                          |                                       |                                         | 1. 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| ECTC-T-8-A                                               | y Rung                                | ipe —                                   | NIOSH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9102 - 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| ECTC-T-38-A                                              |                                       |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| 16-QUT-185-4-A                                           | , 11                                  |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| A50143-Q-24-5-A                                          |                                       |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| NCSO-4-A'                                                | 11                                    |                                         | \                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| ASO421-ENG-21-4-                                         | <u> </u>                              |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| H-01-A.                                                  | (1                                    | 4-0                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  | Decay (Marketing Control of Contr |
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| H-04-4                                                   | 10                                    |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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Received by

Date/Time



Report Date: November 13, 2020

Stephanie Vivanco Phone: 949-382-1534 ToxStrategies

27001 La Paz Road, Suite 260 Mission Viejo, CA 92691

E-mail: svivanco@toxstrategies.com

Workorder: **34-2031258** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: Pent-Blank |                       |                                                 | Collected: 11/03/2020                               |
|-----------------------|-----------------------|-------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031258001    | Sa                    | mpling Location: LA Fire                        | Received: 11/06/2020                                |
| Method: OSHA 39       | Sampling              | Media: Wipe  g Parameter: Volume Not Applicable | Instrument: HPLC14<br>Analyzed: 11/12/2020 (271358) |
| Analyte               | Result<br>(ug/sample) | RL (ug/sample)                                  |                                                     |
| Pentachlorophenol     | <0.50                 | 0.50                                            |                                                     |

| Sample ID: <b>A50143-Q-24-5</b> |             |                                  | Collected: 11/03/2020         |
|---------------------------------|-------------|----------------------------------|-------------------------------|
| Lab ID: 2031258002              | Sa          | impling Location: LA Fire        | Received: 11/06/2020          |
| Method: OSHA 39                 |             | Media: Wipe                      | Instrument: HPLC14            |
|                                 | Samplin     | g Parameter: Volume Not Provided | Analyzed: 11/12/2020 (271358) |
|                                 | Result      |                                  |                               |
| Analyte                         | (ug/sample) | RL (ug/sample)                   |                               |
| Pentachlorophenol               | < 0.50      | 0.50                             |                               |

| Sample ID: ECTC-T-7 |             |                                  | Collected: 11/03/2020         |
|---------------------|-------------|----------------------------------|-------------------------------|
| Lab ID: 2031258003  | Sa          | mpling Location: LA Fire         | Received: 11/06/2020          |
| Method: OSHA 39     |             | Media: Wipe                      | Instrument: HPLC14            |
|                     | Sampling    | g Parameter: Volume Not Provided | Analyzed: 11/12/2020 (271358) |
|                     | Result      |                                  |                               |
| Analyte             | (ug/sample) | RL (ug/sample)                   |                               |
| Pentachlorophenol   | <0.50       | 0.50                             |                               |

| Sample ID: ENG-168-Penta-01 |                    |                                                 | Collected: 11/03/2020                               |
|-----------------------------|--------------------|-------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031258004          | Sa                 | mpling Location: LA Fire                        | Received: 11/06/2020                                |
| Method: OSHA 39             | Samplin            | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: HPLC14<br>Analyzed: 11/12/2020 (271358) |
| Analyte                     | Result (ug/sample) | RL (ug/sample)                                  |                                                     |
| Pentachlorophenol           | <0.50              | 0.50                                            |                                                     |

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

Environmental 🚴

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Page 1 of 4 Fri, 11/13/20 2:12 PM IHREP-V12.7



Workorder: **34-2031258** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: ENG-583-Penta-01 |                       |                                              | Collected: 11/03/2020                               |
|-----------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031258005          | Sa                    | mpling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: OSHA 39             | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: HPLC14<br>Analyzed: 11/12/2020 (271358) |
| Analyte                     | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Pentachlorophenol           | < 0.50                | 0.50                                         |                                                     |

| Sample ID: ENG-558-Penta-01 |                       |                                              | Collected: 11/03/2020                               |
|-----------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031258006          | Sa                    | mpling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: OSHA 39             | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: HPLC14<br>Analyzed: 11/12/2020 (271358) |
| Analyte                     | Result<br>(ug/sample) | RL (ug/sample)                               | ,                                                   |
| Pentachlorophenol           | <0.50                 | 0.50                                         |                                                     |

| Sample ID: ENG-583-Penta-02 |                       |                                                 | Collected: 11/03/2020                               |
|-----------------------------|-----------------------|-------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031258007          | Sa                    | mpling Location: LA Fire                        | Received: 11/06/2020                                |
| Method: OSHA 39             | Samplin               | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: HPLC14<br>Analyzed: 11/12/2020 (271358) |
| Analyte                     | Result<br>(ug/sample) | RL (ug/sample)                                  |                                                     |
| Pentachlorophenol           | <0.50                 | 0.50                                            |                                                     |

| Sample ID: ENG159-Penta-1 |             |                                  | Collected: 11/03/2020         |
|---------------------------|-------------|----------------------------------|-------------------------------|
| Lab ID: 2031258008        | Sa          | ampling Location: LA Fire        | Received: 11/06/2020          |
| Method: OSHA 39           |             | Media: Wipe                      | Instrument: HPLC14            |
|                           | Samplin     | g Parameter: Volume Not Provided | Analyzed: 11/12/2020 (271358) |
|                           | Result      |                                  |                               |
| Analyte                   | (ug/sample) | RL (ug/sample)                   |                               |
| Pentachlorophenol         | <0.50       | 0.50                             |                               |

| Sample ID: Penta-Blank |                       |                                                | Collected: 11/03/2020                               |
|------------------------|-----------------------|------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031258009     | Sa                    | mpling Location: LA Fire                       | Received: 11/06/2020                                |
| Method: OSHA 39        | Sampling              | Media: Wipe g Parameter: Volume Not Applicable | Instrument: HPLC14<br>Analyzed: 11/12/2020 (271358) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                 | , , , , , , , , , , , , , , , , , , ,               |
| Pentachlorophenol      | <0.50                 | 0.50                                           |                                                     |



Workorder: 34-2031258

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: ENG-558-Penta-02 Collected: 11/03/2020 Lab ID: 2031258010 Sampling Location: LA Fire Received: 11/06/2020 Method: OSHA 39 Media: Wipe **Instrument: HPLC14** Sampling Parameter: Volume Not Provided Analyzed: 11/12/2020 (271358) Result (ug/sample) RL (ug/sample) **Analyte** Pentachlorophenol < 0.50 0.50

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method  | Analyst          | Peer Review            |
|---------|------------------|------------------------|
| OCUA 20 | /S/ Thomas Bosch | /S/ Christopher Winter |
| OSHA 39 | 11/13/2020 11:50 | 11/13/2020 14:04       |

#### **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700

960 W Levoy Drive Email: alslt.lab@ALSGlobal.com

Salt Lake City, Utah 84123 Web: www.alsslc.com

#### **General Lab Comments**

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                     |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pjlabs.com                                                                      |



Workorder: **34-2031258** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- \*\* No result could be reported, see sample comments for details.
- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.





# ANALYTICAL REQUEST FORM

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1. REGULAR Status                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| ALS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | RUSH Status Requested - ADDITIONAL CHARGE RESULTS REQUIRED BY DATE CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES                            |
| 2. Date 11/0 S/ W2 Furchase Order No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4. Quote No.                                                                                                                                 |
| 3. Company Name: TOXStrategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ALS Project Manager: J Heland                                                                                                                |
| Address: 27001 La Paz Rd Su                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                              |
| mission Viejo CA 92691                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sampling Site LA Fire                                                                                                                        |
| Person to Contact: Stephanie VIVan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                              |
| Telephone (149) 382 -1534                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Date of Collection 11/3/2020 -11/4/2020                                                                                                      |
| Fax Telephone ( )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Time Collected                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Utgles. Whate of Shipment                                                                                                                    |
| Billing Address (if different from above)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                                                                                                                                            |
| billing Address (if different from above)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Chain of Custody No.:  6. How did you first learn about ALS?                                                                                 |
| No. of the second secon | 6. How did you first learn about ALS?                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
| 7. REQUEST FOR ANALYSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                              |
| Client Sample Number Matrix* Sample/Area Volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ANALYSES REQUESTED - Use method number if known Units** Lab Comments                                                                         |
| Pent-Blank gauze -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OsHA39- Pentachlorophanol 1                                                                                                                  |
| A50143-Q-24-S ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
| ECTC-T-7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                              |
| ENG-168-Penta-01'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                              |
| ENG-583 Penta-01:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                              |
| ENG-558-Panta-01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                              |
| ENG-583-Penta-01, -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                              |
| ENG159-12012-11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ·                                                                                                                                            |
| PENTA-BLANK 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                              |
| ENG-558-Penta-02 1 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
| ** 1. μg/sample 2. mg/m³ 3. ppm 4. % 5. μg/m³ 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ger solution; Bulk sample; Blood; Urine; Tissue; Soil; Water; Other (other) Please indicate one or more units in the column entitled Units** |
| Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
| Possible Contamination and/or Chemical Hazards 7. Chain of Custody (Optional)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                              |
| Relinquished by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |
| Received by Tun Wassell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Date/Time $1-90-30-90$                                                                                                                       |
| Relinquished by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Date/Time                                                                                                                                    |
| Received by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Date/Time                                                                                                                                    |



Report Date: November 12, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: 34-2031261
Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: EL0000 Collected: 11/03/2020 Lab ID: 2031261001 Sampling Location: La Fire Received: 11/06/2020 Method: 3M 3500/3520 POVM Media: 3M 3500 ORGANIC POVM **Instrument: GCI37** Analyzed: 11/12/2020 (271369) **Sampling Parameter: Exposure Not Provided** Result **Analyte** (mg/sample) Result (mg/m³) Result (ppm) RL (mg/sample) Benzene <0.0010 NA 0.0010 NA NA Ethyl benzene < 0.010 0.010 Naphthalene < 0.010 NΑ NA 0.010 Styrene < 0.010 NA NA 0.010

Sample ID: EL0064 Collected: 11/03/2020 Lab ID: 2031261002 Sampling Location: La Fire Received: 11/06/2020 Method: 3M 3500/3520 POVM Media: 3M 3500 ORGANIC POVM **Instrument: GCI37 Sampling Parameter: Exposure 349 Minutes** Analyzed: 11/12/2020 (271369) Result **Analyte** (mg/sample) Result (mg/m³) Result (ppm) RL (mg/sample) Benzene 0.0084 0.68 0.21 0.0010 Ethyl benzene < 0.010 <1.0 < 0.24 0.010 Naphthalene <1.2 < 0.010 < 0.22 0.010 Styrene < 0.010 < 0.99 < 0.23 0.010

| Sample ID: <b>EL0139</b> Lab ID: 2031261003 | Sai                   | mpling Location: La F | Collected: 11/03/2020<br>Received: 11/06/2020 |                |
|---------------------------------------------|-----------------------|-----------------------|-----------------------------------------------|----------------|
| Method: 3M 3500/3520 POVM                   | Jai                   | Media: 3M 3500        | Instrument: GCI37                             |                |
|                                             | Sampling              | Parameter: Exposure   | Analyzed: 11/12/2020 (271369)                 |                |
| Analyte                                     | Result<br>(mg/sample) | Result (mg/m³)        | Result (ppm)                                  | RL (mg/sample) |
| Benzene                                     | 0.0037                | 0.30                  | 0.093                                         | 0.0010         |
| Ethyl benzene                               | <0.010                | <1.0                  | <0.24                                         | 0.010          |
| Naphthalene                                 | <0.010                | <1.2                  | <0.22                                         | 0.010          |
| Styrene                                     | <0.010                | < 0.99                | <0.23                                         | 0.010          |

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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Workorder: **34-2031261** Client Project ID: La Fire 110320 Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: EL0207         |                                                                       |                       | Collected: 11/03/2020 |                                  |               |
|---------------------------|-----------------------------------------------------------------------|-----------------------|-----------------------|----------------------------------|---------------|
| Lab ID: 2031261004        | Sa                                                                    | mpling Location: La F | ire                   | Received                         | d: 11/06/2020 |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure Not Provided |                       |                       | Instrument: GCI3 Analyzed: 11/12 |               |
| Analyte                   | Result (mg/sample)                                                    | Result (mg/m³)        | Result (ppm)          | RL (mg/sample)                   |               |
| Benzene                   | <0.0010                                                               | NA                    | NA                    | 0.0010                           |               |
| Ethyl benzene             | <0.010                                                                | NA                    | NA                    | 0.010                            |               |
| Naphthalene               | < 0.010                                                               | NA                    | NA                    | 0.010                            |               |

| Sample ID: <b>EL0089</b>  |                                                                      |                       | Collected: 11/03/2020 |                                  |               |
|---------------------------|----------------------------------------------------------------------|-----------------------|-----------------------|----------------------------------|---------------|
| Lab ID: 2031261005        | Sa                                                                   | mpling Location: La F | ire                   | Received                         | d: 11/06/2020 |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 542 Minutes |                       |                       | Instrument: GCI3 Analyzed: 11/12 |               |
| Analyte                   | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm)          | RL (mg/sample)                   |               |
| Benzene                   | <0.0010                                                              | <0.052                | < 0.016               | 0.0010                           |               |
| Ethyl benzene             | <0.010                                                               | <0.68                 | <0.16                 | 0.010                            |               |
| Naphthalene               | <0.010                                                               | <0.75                 | <0.14                 | 0.010                            |               |

| Sample ID: EL0053         |                                                                      |                       |              | Collecte                        | d: 11/03/2020         |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|---------------------------------|-----------------------|
| Lab ID: 2031261006        | Sai                                                                  | mpling Location: La F | Receive      | d: 11/06/2020                   |                       |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 547 Minutes |                       |              | Instrument: GCI3 Analyzed: 11/1 | 37<br>2/2020 (271369) |
| Analyte                   | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                  |                       |
| Benzene                   | <0.0010                                                              | <0.051                | < 0.016      | 0.0010                          |                       |
| Ethyl benzene             | <0.010                                                               | <0.67                 | <0.15        | 0.010                           |                       |
| Naphthalene               | <0.010                                                               | <0.74                 | < 0.14       | 0.010                           |                       |

| Sample ID: EL0132         |                       |                                      | Collecte                          | ed: 11/03/2020         |                |
|---------------------------|-----------------------|--------------------------------------|-----------------------------------|------------------------|----------------|
| Lab ID: 2031261007        | Sai                   | mpling Location: La F                | ire                               | Receive                | ed: 11/06/2020 |
| Method: 3M 3500/3520 POVM | Sampling              | Media: 3M 3500<br>Parameter: Exposur | Instrument: GCI<br>Analyzed: 11/1 | 37<br>12/2020 (271369) |                |
| Analyte                   | Result<br>(mg/sample) | Result (mg/m³)                       | Result (ppm)                      | RL (mg/sample)         |                |
| Benzene                   | <0.0010               | <0.058                               | <0.018                            | 0.0010                 |                |
| Ethyl benzene             | <0.010                | <0.75                                | <0.17                             | 0.010                  |                |
| Naphthalene               | < 0.010               | <0.84                                | <0.16                             | 0.010                  |                |

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Workorder: **34-2031261** Client Project ID: La Fire 110320 Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: <b>EL0122</b><br>Lab ID: 2031261008 | Sa                                                                   | mpling Location: La F |              | l: 11/03/2020<br>l: 11/06/2020   |   |
|------------------------------------------------|----------------------------------------------------------------------|-----------------------|--------------|----------------------------------|---|
| Method: 3M 3500/3520 POVM                      | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 547 Minutes |                       |              | Instrument: GCI3 Analyzed: 11/12 | • |
| Analyte                                        | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                   |   |
| Benzene                                        | <0.0010                                                              | <0.051                | < 0.016      | 0.0010                           |   |
| Ethyl benzene                                  | <0.010                                                               | <0.67                 | <0.15        | 0.010                            |   |
| Naphthalene                                    | <0.010                                                               | <0.74                 | <0.14        | 0.010                            |   |

| Sample ID: <b>EL0086</b> Lab ID: 2031261009 | Sa                                                                   | mpling Location: La F | ïre          |                                       | 11/03/2020<br>11/06/2020 |
|---------------------------------------------|----------------------------------------------------------------------|-----------------------|--------------|---------------------------------------|--------------------------|
| Method: 3M 3500/3520 POVM                   | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 487 Minutes |                       |              | Instrument: GCI37<br>Analyzed: 11/12/ | ,                        |
| Analyte                                     | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                        |                          |
| Benzene                                     | <0.0010                                                              | <0.058                | <0.018       | 0.0010                                |                          |
| Ethyl benzene                               | <0.010                                                               | <0.75                 | <0.17        | 0.010                                 |                          |
| Naphthalene                                 | <0.010                                                               | <0.83                 | <0.16        | 0.010                                 |                          |

| Sample ID: EL0134         |                                                                      |                       |              | Collecte                          | d: 11/03/2020         |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|-----------------------------------|-----------------------|
| Lab ID: 2031261010        | Sai                                                                  | mpling Location: La F | Receive      | d: 11/06/2020                     |                       |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 467 Minutes |                       |              | Instrument: GCI<br>Analyzed: 11/1 | 37<br>2/2020 (271369) |
| Analyte                   | Result (mg/sample)                                                   | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                    |                       |
| Benzene                   | <0.0010                                                              | <0.060                | < 0.019      | 0.0010                            |                       |
| Ethyl benzene             | <0.010                                                               | <0.78                 | <0.18        | 0.010                             |                       |
| Naphthalene               | <0.010                                                               | <0.87                 | <0.17        | 0.010                             |                       |

| Sample ID: EL0146         |                                                                      |                       |              | Collected: 11                           | /03/2020    |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|-----------------------------------------|-------------|
| Lab ID: 2031261011        | Sa                                                                   | mpling Location: La F | Received: 11 | 1/06/2020                               |             |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 461 Minutes |                       |              | Instrument: GCl37<br>Analyzed: 11/12/20 | 20 (271369) |
| Analyte                   | Result (mg/sample)                                                   | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                          |             |
| Benzene                   | <0.0010                                                              | <0.061                | <0.019       | 0.0010                                  |             |
| Ethyl benzene             | <0.010                                                               | <0.79                 | <0.18        | 0.010                                   |             |
| Naphthalene               | < 0.010                                                              | <0.88                 | <0.17        | 0.010                                   |             |

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Workorder: **34-2031261** 

Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: EL0042 Collected: 11/03/2020 Lab ID: 2031261012 Sampling Location: La Fire Received: 11/06/2020 Method: 3M 3500/3520 POVM Media: 3M 3500 ORGANIC POVM **Instrument: GCI37** Sampling Parameter: Exposure 546 Minutes Analyzed: 11/12/2020 (271369) Result **Analyte** (mg/sample) Result (mg/m³) Result (ppm) RL (mg/sample) Benzene < 0.0010 < 0.052 < 0.016 0.0010 Ethyl benzene < 0.010 < 0.67 < 0.15 0.010 < 0.74 Naphthalene < 0.010 < 0.14 0.010

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method            | Analyst            | Peer Review          |
|-------------------|--------------------|----------------------|
| 2M 2500/2520 DOVM | /S/ Katelyn Hinman | /S/ Steven J. Sagers |
| 3M 3500/3520 POVM | 11/12/2020 15:44   | 11/12/2020 17:04     |

#### **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700

960 W Levoy Drive Email: alslt.lab@ALSGlobal.com

Salt Lake City, Utah 84123 Web: www.alsslc.com

#### **General Lab Comments**

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                     |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pjlabs.com                                                                      |



Workorder: **34-2031261** 

Client Project ID: La Fire 110320

Purchase Order: NA

Project Manager: Jessica Helland

Defini i

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method media instrument sensiti ity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A erified alue of method media instrument sensiti ity.

ND = Not Detected, Testing result not detected abo e the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical alue.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than alues at or abo e the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.

**ANALYTICAL REQUEST FORM** 

|                                                                        | 1. REGULAR Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | RUSH Status Requested - ADDITIONAL CHARGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                        | RESULTS REQUIRED BY  DATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (ALS)                                                                  | CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2. Date 11/05/2020 Purchase Order No.                                  | 4. Quote No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3. Company Name: TOX'Strategies                                        | ALS Project Manager: JHU and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Address: 27001 La Part Rd SUH                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| mission Viejo CA 42691                                                 | Sampling Site LA Fire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Person to Contact: Stephanie VIV                                       | Industrial Process:  Date of Collection 11/3/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Telephone (949 382 - 1534                                              | Date of Collection 11/3/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Fax Telephone ( )                                                      | Time Collected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-mail Address: SNVanco @ tox Str                                      | ategles. Lom Date of Shipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Billing Address (if different from above)                              | Chain of Custody No.:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                        | 6. How did you first learn about ALS?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7 DECUEST FOR ANALYSES                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7. REQUEST FOR ANALYSES  Client Sample Number Matrix* Sample/Area Volu | me ANALYSES REQUESTED - Use method number if known Units** Lab Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| EL0000 badge -                                                         | NIOSH 1501- haphthalene, styrene 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| EL 0064 1 349 min                                                      | 1 S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| EL 0139   349 min                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL 0207                                                                | NIGH ISUI - benzene environe 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| EL 0089 542 mir                                                        | NIOSH ISOI - benzene, ethylbens 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| EL 0053 547 mil                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL 0132 486 MI                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL 0122 S47 MI                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL 0086 487 mi                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL 0134 467 mir                                                        | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| EL 0146 461 m                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL0042 1 546 mi                                                        | <u>n</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                        | <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                        | In the second of |
|                                                                        | Impinger solution; Bulk sample; Blood; Urine; Tissue; Soil; Water; Other  6 (other) Please indicate one or more units in the column entitled Units**                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Comments                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| * First 3 Sample                                                       | es include styrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Possible Contamination and/or Chemical Hazards                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7. Chain of Custody (Optional)                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Relinquished by                                                        | Date/Time 11/05/2020 (560)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Received by ///////////////////////////////////                        | Date/Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Relinquished by                                                        | Date/Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Received by                                                            | Date/Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



Report Date: November 13, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: 34-2031263
Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: EL0232 Collected: 11/04/2020 Lab ID: 2031263001 Sampling Location: La Fire Received: 11/06/2020 Method: 3M 3500/3520 POVM Media: 3M 3500 ORGANIC POVM Instrument: GCI37 **Sampling Parameter: Exposure 430 Minutes** Analyzed: 11/13/2020 (271418) Result RL (mg/sample) **Analyte** (mg/sample) Result (mg/m<sup>3</sup>) Result (ppm) Benzene <0.0010 < 0.066 <0.021 0.0010 Ethyl benzene < 0.010 < 0.85 0.010 < 0.20 Naphthalene < 0.010 < 0.95 <0.18 0.010

| Sample ID: EL0107         |                                                                      |                       |              | Collected                        | l: 11/04/2020 |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|----------------------------------|---------------|
| Lab ID: 2031263002        | Sai                                                                  | mpling Location: La F | Received     | l: 11/06/2020                    |               |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 396 Minutes |                       |              | Instrument: GCI3 Analyzed: 11/13 |               |
| Analyte                   | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                   |               |
| Benzene                   | <0.0010                                                              | <0.071                | <0.022       | 0.0010                           |               |
| Ethyl benzene             | <0.010                                                               | < 0.93                | <0.21        | 0.010                            |               |
| Naphthalene               | <0.010                                                               | <1.0                  | <0.20        | 0.010                            |               |

| Sample ID: <b>EL0102</b><br>Lab ID: 2031263003 | Sa                                                                   | mpling Location: La F |              | 11/04/2020<br>11/06/2020               |               |
|------------------------------------------------|----------------------------------------------------------------------|-----------------------|--------------|----------------------------------------|---------------|
| Method: 3M 3500/3520 POVM                      | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 440 Minutes |                       |              | Instrument: GCI37<br>Analyzed: 11/13/2 | 2020 (271418) |
| Analyte                                        | Result (mg/sample)                                                   | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                         |               |
| Benzene                                        | <0.0010                                                              | <0.064                | <0.020       | 0.0010                                 |               |
| Ethyl benzene                                  | <0.010                                                               | <0.83                 | <0.19        | 0.010                                  |               |
| Naphthalene                                    | <0.010                                                               | <0.92                 | <0.18        | 0.010                                  |               |

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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Workorder: **34-2031263** Client Project ID: La Fire 110420 Purchase Order: NA

Project Manager: Jessica Helland

# **Analytical Results**

| Sample ID: EL0031         |                                                                       |                       |              | Collected                        | d: 11/04/2020 |
|---------------------------|-----------------------------------------------------------------------|-----------------------|--------------|----------------------------------|---------------|
| Lab ID: 2031263004        | Sa                                                                    | mpling Location: La F | Received     | l: 11/06/2020                    |               |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure Not Provided |                       |              | Instrument: GCI3 Analyzed: 11/13 | •             |
| Analyte                   | Result (mg/sample)                                                    | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                   |               |
| Benzene                   | <0.0010                                                               | NA                    | NA           | 0.0010                           |               |
| Ethyl benzene             | <0.010                                                                | NA                    | NA           | 0.010                            |               |
| Naphthalene               | < 0.010                                                               | NA                    | NA           | 0.010                            |               |

| Sample ID: EL0110         |                                                                      |                       |              | Collected                        | d: 11/04/2020 |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|----------------------------------|---------------|
| Lab ID: 2031263005        | Sa                                                                   | mpling Location: La F | Received     | d: 11/06/2020                    |               |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 433 Minutes |                       |              | Instrument: GCI3 Analyzed: 11/13 |               |
| Analyte                   | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                   |               |
| Benzene                   | <0.0010                                                              | <0.065                | <0.020       | 0.0010                           |               |
| Ethyl benzene             | <0.010                                                               | <0.85                 | <0.19        | 0.010                            |               |
| Naphthalene               | <0.010                                                               | < 0.94                | <0.18        | 0.010                            |               |

| Sample ID: EL0060         |                                                                      |                       |              | Collected                        | d: 11/04/2020 |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|----------------------------------|---------------|
| Lab ID: 2031263006        | Sai                                                                  | mpling Location: La F | Received     | d: 11/06/2020                    |               |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 427 Minutes |                       |              | Instrument: GCI3 Analyzed: 11/13 | -             |
| Analyte                   | Result<br>(mg/sample)                                                | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                   |               |
| Benzene                   | <0.0010                                                              | <0.066                | <0.021       | 0.0010                           |               |
| Ethyl benzene             | <0.010                                                               | <0.86                 | <0.20        | 0.010                            |               |
| Naphthalene               | <0.010                                                               | <0.95                 | <0.18        | 0.010                            |               |

| Sample ID: EL0128         |                                                                      |                       |              | Collected: 1                            | 1/04/2020    |
|---------------------------|----------------------------------------------------------------------|-----------------------|--------------|-----------------------------------------|--------------|
| Lab ID: 2031263007        | Sa                                                                   | mpling Location: La F | Received: 1  | 1/06/2020                               |              |
| Method: 3M 3500/3520 POVM | Media: 3M 3500 ORGANIC POVM Sampling Parameter: Exposure 422 Minutes |                       |              | Instrument: GCl37<br>Analyzed: 11/13/20 | )20 (271418) |
| Analyte                   | Result (mg/sample)                                                   | Result (mg/m³)        | Result (ppm) | RL (mg/sample)                          |              |
| Benzene                   | <0.0010                                                              | <0.067                | <0.021       | 0.0010                                  |              |
| Ethyl benzene             | <0.010                                                               | <0.87                 | <0.20        | 0.010                                   |              |
| Naphthalene               | <0.010                                                               | < 0.96                | <0.18        | 0.010                                   |              |



Workorder: **34-2031263** 

Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: EL0129 Collected: 11/04/2020 Lab ID: 2031263008 Sampling Location: La Fire Received: 11/06/2020 Method: 3M 3500/3520 POVM Media: 3M 3500 ORGANIC POVM **Instrument: GCI37** Analyzed: 11/13/2020 (271418) Sampling Parameter: Exposure 427 Minutes Result Result (mg/m³) **Analyte** (mg/sample) Result (ppm) RL (mg/sample) Benzene < 0.0010 < 0.066 < 0.021 0.0010 Ethyl benzene < 0.010 < 0.86 < 0.20 0.010 Naphthalene < 0.010 < 0.95 < 0.18 0.010

Sample ID: EL0135 Collected: 11/04/2020 Received: 11/06/2020 Lab ID: 2031263009 Sampling Location: La Fire Media: 3M 3500 ORGANIC POVM Method: 3M 3500/3520 POVM **Instrument: GCI37** Analyzed: 11/13/2020 (271418) **Sampling Parameter: Exposure 436 Minutes** Result **Analyte** (mg/sample) Result (mg/m³) Result (ppm) RL (mg/sample) < 0.0010 < 0.065 < 0.020 0.0010 Benzene < 0.010 < 0.84 0.010 Ethyl benzene < 0.19 Naphthalene < 0.010 < 0.93 < 0.18 0.010

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method            | Analyst            | Peer Review         |  |
|-------------------|--------------------|---------------------|--|
| 2M 2500/2500 POVM | /S/ Katelyn Hinman | /S/ Matthew Roberts |  |
| 3M 3500/3520 POVM | 11/13/2020 16:15   | 11/13/2020 16:20    |  |

#### **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive

Salt Lake City, Utah 84123

Phone: (801) 266-7700

Email: alslt.lab@ALSGlobal.com

Web: www.alsslc.com

Page 3 of 4 Fri, 11/13/20 4:27 PM IHREP-V12.7



Workorder: 34-2031263

Client Project ID: La Fire 110420

Purchase Order: NA

Project Manager: Jessica Helland

#### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                     |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pjlabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

<sup>\*\*</sup> No result could be reported, see sample comments for details.





|                                                     | <b>A</b>        | _                  | 1. REG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ULAR Statu  | ıs                                                                                                             |                                       | <u> </u>                 | 10100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| AL                                                  | 5               |                    | RES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ULTS REQU   | equested - ADDI<br>JIRED BY<br>SALT LAKE PRI                                                                   | DATE                                  |                          | -<br>PLES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2. Date 11/05/2020                                  | Purchase Ord    | er No.             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | ote No.                                                                                                        |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3. Company Name :                                   |                 |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ALS         | S Project Manage                                                                                               | er:                                   | Hella                    | nd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Address: 27001                                      | La Paz          | : Ra surte         | 260                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <br>5. Sar  | mple Collection                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| mission                                             |                 | a.                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | mpling Site                                                                                                    | I L                                   | thro                     | <b>à</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Person to Contact:                                  |                 |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | ustrial Process:                                                                                               |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Telephone (149)                                     | 582-19          | 24                 | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | — Dat       | te of Collection                                                                                               | 11 /                                  | 1/70                     | 210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                     | 206-15          |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Fax Telephone ( ) E-mail Address:                   | 11/41/07/10     | Cal Loveh          | akaje                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Billing Address (if differ                          | ent from above) |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 7. REQUEST FOR ANAL                                 | VSES            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Client Sample Number                                | Matrix*         | Sample/Area Volume | ANALYSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | REQUESTED   | - Use method num                                                                                               | ber if known                          | Units**                  | Lab Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EL0232                                              | <del></del>     |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | enzene et                                                                                                      |                                       | ene                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL0107                                              | badge           | 396 min            | MODEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1201        | naphtha                                                                                                        | ine                                   |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| EL 0102                                             |                 | 440 min            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       | 1                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL-0631                                             |                 | 14900 510          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ELONO                                               |                 | 430 min            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       | $\vdash \nearrow \vdash$ | By Administration of the Control of  |
| EL 0060                                             |                 | 427 min            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       | 12                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <u>EL0129</u>                                       |                 | 427 min            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EL0135                                              |                 | 436 min            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       | -5-                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| * Specify: Solid sorbent<br>** 1. μg/sample 2. mg/n |                 |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Comments                                            |                 | ·                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                | · · · · · · · · · · · · · · · · · · · |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Possible Contamination a                            | nd/or Chemical  | Hazards            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 7. Chain of Custody (⊖r                             | stional)        |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                                                                                                |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Relinquished by                                     | SIL             |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Date/       | Time                                                                                                           | 05/7                                  | SO                       | 1500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Received by                                         | TMINA           | TIII Dart          | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Date/       | Time 11.                                                                                                       | 6.2021                                | 09.60                    | )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| Relinquished by                                     | $\rightarrow$   |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Date/       | ııme                                                                                                           |                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Received by

Date/Time



#### Amended-20201216

Report Date: December 16, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: 34-2031264

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: ENG583-A-1 Collected: 11/04/2020 Lab ID: 2031264001 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 9102 Mod, Ghost Wipe Media: Wipe **Instrument: ICP13 Sampling Parameter: Volume Not Provided** Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) Result **Analyte** (ug/sample) RL (ug/sample) Arsenic <6.3 6.3 Lead 0.50 54

| Sample ID: ENG-558-A-01           |                       |                                                 | Collected: 11/04/2020                                                               |
|-----------------------------------|-----------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031264002                | Sa                    | ampling Location: LA Fire                       | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wij |                       | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
| Analyte                           | Result<br>(ug/sample) | RL (ug/sample)                                  |                                                                                     |
| Arsenic                           | <6.3                  | 6.3                                             |                                                                                     |
| Lead                              | 5.9                   | 0.50                                            |                                                                                     |

| Sample ID: ENG159-A-1              |            |                                                 | Collected: 11/04/2020                                                               |
|------------------------------------|------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| Lab ID: 2031264003                 | Sa         | mpling Location: LA Fire                        | Received: 11/06/2020                                                                |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin    | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: ICP13<br>Prepared: 11/09/2020 (271142)<br>Analyzed: 11/11/2020 (271304) |
|                                    | Result     |                                                 |                                                                                     |
| Analyte (                          | ug/sample) | RL (ug/sample)                                  |                                                                                     |
| Arsenic                            | <6.3       | 6.3                                             |                                                                                     |
| Lead                               | 25         | 0.50                                            |                                                                                     |

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## Amended-20201216

Workorder: **34-2031264** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: ENG-583-A-02            |            |                                                | Collected: 11/04/2020                                                            |
|------------------------------------|------------|------------------------------------------------|----------------------------------------------------------------------------------|
| Lab ID: 2031264004                 | S          | ampling Location: LA Fire                      | Received: 11/06/2020                                                             |
| Method: NIOSH 9102 Mod, Ghost Wipe | Sampli     | Media: Wipe<br>ng Parameter: Volume Not Provid | Instrument: ICP13 ed Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
|                                    | Result     |                                                |                                                                                  |
| Analyte (u                         | ıg/sample) | RL (ug/sample)                                 |                                                                                  |
| Arsenic                            | <6.3       | 6.3                                            |                                                                                  |
| Lead                               | 3.5        | 0.50                                           |                                                                                  |

| Sample ID: A-Blank Lab ID: 2031264005 | 9                  | ampling Location: LA Fire                       | Collected: 11/04/2020<br>Received: 11/06/2020                                 |
|---------------------------------------|--------------------|-------------------------------------------------|-------------------------------------------------------------------------------|
| Method: NIOSH 9102 Mod, Ghost Wij     | ре                 | Media: Wipe ng Parameter: Volume Not Applicable | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte                               | Result (ug/sample) | RL (ug/sample)                                  |                                                                               |
| Arsenic                               | <6.3               | 6.3                                             |                                                                               |
| Lead                                  | <0.50              | 0.50                                            |                                                                               |

| Sample ID: <b>ENG-168-A-01</b> Lab ID: 2031264006 | S                    | ampling Location: LA Fire                       | Collected: 11/04/2020<br>Received: 11/06/2020                                 |
|---------------------------------------------------|----------------------|-------------------------------------------------|-------------------------------------------------------------------------------|
| Method: NIOSH 9102 Mod, Ghost Wipe                | Sampli               | Media: Wipe<br>ng Parameter: Volume Not Provide | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
| Analyte (r                                        | Result<br>ug/sample) | RL (ug/sample)                                  |                                                                               |
| Arsenic                                           | <6.3                 | 6.3                                             |                                                                               |
| Lead                                              | 4.6                  | 0.50                                            |                                                                               |

| Sample ID: ENG-558-A-02            |           |                                                 | Collected: 11/04/2020                                                         |
|------------------------------------|-----------|-------------------------------------------------|-------------------------------------------------------------------------------|
| Lab ID: 2031264007                 | Sa        | ampling Location: LA Fire                       | Received: 11/06/2020                                                          |
| Method: NIOSH 9102 Mod, Ghost Wipe | Samplin   | Media: Wipe<br>og Parameter: Volume Not Provide | Instrument: ICP13 Prepared: 11/09/2020 (271142) Analyzed: 11/11/2020 (271304) |
|                                    | Result    |                                                 |                                                                               |
| Analyte (ug                        | g/sample) | RL (ug/sample)                                  |                                                                               |
| Arsenic                            | <6.3      | 6.3                                             |                                                                               |
| Lead                               | 3.0       | 0.50                                            |                                                                               |

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## Amended-20201216

Workorder: **34-2031264** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: <b>40203</b>                |                    |                                      |                      | Collected: 11/04/2020                               |
|----------------------------------------|--------------------|--------------------------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031264008                     | 9                  | Sampling Location: LA                | Received: 11/06/2020 |                                                     |
| Method: NIOSH 0600 Mod., MW PVC Filter | Media: PVC Filter  |                                      |                      | Instrument: GRAV01                                  |
|                                        | Sampl              | ing Parameter: Air Vol               | ume 1055 L           | Analyzed: 11/12/2020 (271348)                       |
| Analyte                                | Result (mg/sample) | Result (mg/m³)                       | RL (mg/sample)       |                                                     |
| Respirable Dust                        | 0.038              | 0.036                                | 0.020                |                                                     |
| Method: NIOSH 7500 Mod.                | Sampl              | Media: PVC Filing Parameter: Air Vol |                      | Instrument: XRAY01<br>Analyzed: 11/13/2020 (271448) |
| Analyte                                | Result (ug/sample) | Result (ug/m³)                       | Result (%)           | RL (ug/sample)                                      |
| Quartz                                 | <5.0               | <4.7                                 | <13                  | 5.0                                                 |
| Cristobalite                           | <5.0               | <4.7                                 | <13                  | 5.0                                                 |
| Tridymite                              | <20                | <19                                  | <53                  | 20                                                  |
| Total Silica                           | ND                 |                                      |                      |                                                     |

| Sample ID: <b>40204</b>                   |                                |                                                                    |                                          | Collected: 11/04/2020                               |
|-------------------------------------------|--------------------------------|--------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031264009                        | 9                              | Sampling Location: LA                                              | Fire                                     | Received: 11/06/2020                                |
| Method: NIOSH 0600 Mod., MW PVC<br>Filter |                                | Media: PVC Fil                                                     | ter                                      | Instrument: GRAV01                                  |
|                                           | Sampl                          | ing Parameter: Air Vol                                             | ume 1042.5 L                             | Analyzed: 11/12/2020 (271348)                       |
| Analyte                                   | Result (mg/sample)             | Result (mg/m³)                                                     | RL (mg/sample)                           |                                                     |
| Respirable Dust                           | 0.030                          | 0.029                                                              | 0.020                                    |                                                     |
| ricopirable Bast                          | 0.000                          | 0.023                                                              | 0.020                                    |                                                     |
| Method: NIOSH 7500 Mod.                   |                                | Media: PVC Filing Parameter: Air Vol                               | ter                                      | Instrument: XRAY01<br>Analyzed: 11/13/2020 (271448) |
| •                                         |                                | Media: PVC Fil                                                     | ter                                      |                                                     |
| Method: NIOSH 7500 Mod.                   | Sampl<br>Result                | Media: PVC Fii<br>ing Parameter: Air Vol                           | ter<br>ume 1042.5 L                      | Analyzed: 11/13/2020 (271448)                       |
| Method: NIOSH 7500 Mod.  Analyte          | Sampl<br>Result<br>(ug/sample) | Media: PVC Fiiing Parameter: Air Vol                               | tter<br>ume 1042.5 L<br>Result (%)       | Analyzed: 11/13/2020 (271448)  RL (ug/sample)       |
| Method: NIOSH 7500 Mod.  Analyte  Quartz  | Sampl Result (ug/sample) <5.0  | Media: PVC Fii<br>ing Parameter: Air Vol<br>Result (ug/m³)<br><4.8 | ter<br>ume 1042.5 L<br>Result (%)<br><17 | Analyzed: 11/13/2020 (271448)  RL (ug/sample)  5.0  |

| Sample ID: <b>40174</b>                |             |                      |                      | Collected: 11/04/2020         |
|----------------------------------------|-------------|----------------------|----------------------|-------------------------------|
| Lab ID: 2031264010                     | Sa          | mpling Location: LA  | Received: 11/06/2020 |                               |
| Method: NIOSH 0600 Mod., MW PVC Filter |             | Media: PVC Fil       | Instrument: GRAV01   |                               |
|                                        | Samplin     | g Parameter: Air Vol | ume 982.5 L          | Analyzed: 11/12/2020 (271348) |
|                                        | Result      |                      |                      |                               |
| Analyte                                | (mg/sample) | Result (mg/m³)       | RL (mg/sample)       |                               |
| Respirable Dust                        | <0.020      | <0.020               | 0.020                |                               |



## Amended-20201216

Workorder: **34-2031264** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: <b>40174</b> Lab ID: 2031264010 | Sai                   | mpling Location: LA                | Fire                                                | Collected: 11/04/2020<br>Received: 11/06/2020 |
|--------------------------------------------|-----------------------|------------------------------------|-----------------------------------------------------|-----------------------------------------------|
| Method: NIOSH 7500 Mod.                    |                       | Media: PVC Fil  Parameter: Air Vol | Instrument: XRAY01<br>Analyzed: 11/13/2020 (271448) |                                               |
| Analyte                                    | Result<br>(ug/sample) | Result (ug/m³)                     | RL (ug/sample)                                      | , , , , , , , , , , , , , , , , , , , ,       |
| Quartz                                     | <5.0                  | <5.1                               | 5.0                                                 |                                               |
| Cristobalite                               | <5.0                  | <5.1                               | 5.0                                                 |                                               |
| Tridymite                                  | <20                   | <20                                | 20                                                  |                                               |
| Total Silica                               | ND                    |                                    |                                                     |                                               |

| Sample ID: <b>40193</b>                |                       |                                        |                      | Collected: 11/04/2020                               |
|----------------------------------------|-----------------------|----------------------------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031264011                     | Sa                    | mpling Location: LA                    | Received: 11/06/2020 |                                                     |
| Method: NIOSH 0600 Mod., MW PVC Filter | Media: PVC Filter     |                                        |                      | Instrument: GRAV01                                  |
|                                        | Sampling              | g Parameter: Air Vol                   | ume 785 L            | Analyzed: 11/12/2020 (271348)                       |
| Analyte                                | Result (mg/sample)    | Result (mg/m³)                         | RL (mg/sample)       |                                                     |
| Respirable Dust                        | <0.020                | <0.025                                 | 0.020                |                                                     |
| Method: NIOSH 7500 Mod.                | Samplin               | Media: PVC Fil<br>g Parameter: Air Vol | ·                    | Instrument: XRAY01<br>Analyzed: 11/13/2020 (271448) |
| Analyte                                | Result<br>(ug/sample) | Result (ug/m³)                         | RL (ug/sample)       |                                                     |
| Quartz                                 | <5.0                  | <6.4                                   | 5.0                  |                                                     |
| Cristobalite                           | <5.0                  | <6.4                                   | 5.0                  |                                                     |
| Tridymite                              | <20                   | <25                                    | 20                   |                                                     |
| Total Silica                           | ND                    |                                        |                      |                                                     |

| Sample ID: <b>40183</b>                |                    |                       |                  | Collected: 11/04/2020         |
|----------------------------------------|--------------------|-----------------------|------------------|-------------------------------|
| Lab ID: 2031264012                     | S                  | Sampling Location: LA | Fire             | Received: 11/06/2020          |
| Method: NIOSH 0600 Mod., MW PVC Filter | Media: PVC Filter  |                       |                  | Instrument: GRAV01            |
|                                        | Sampli             | ng Parameter: Air Vol | ume Not Provided | Analyzed: 11/12/2020 (271348) |
| Analyte                                | Result (mg/sample) | Result (mg/m³)        | RL (mg/sample)   |                               |
| Respirable Dust                        | < 0.020            | NA                    | 0.020            |                               |
| Method: NIOSH 7500 Mod.                |                    | Media: PVC Fil        | ter              | Instrument: XRAY01            |
|                                        | Sampli             | ng Parameter: Air Vol | ume Not Provided | Analyzed: 11/13/2020 (271448) |
| Analyte                                | Result (ug/sample) | Result (ug/m³)        | RL (ug/sample)   |                               |
| Quartz                                 | <5.0               | NA                    | 5.0              |                               |
| Cristobalite                           | <5.0               | NA                    | 5.0              |                               |
| Tridymite                              | <20                | NA                    | 20               |                               |
| Total Silica                           | ND                 |                       |                  |                               |



### Amended-20201216

Workorder: **34-2031264** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

| Sample ID: <b>40173</b>                |                    |                                      |                      | Collected: 11/04/2020                               |
|----------------------------------------|--------------------|--------------------------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031264013                     | 5                  | Sampling Location: LA                | Received: 11/06/2020 |                                                     |
| Method: NIOSH 0600 Mod., MW PVC Filter |                    | Media: PVC Fil                       | ter                  | Instrument: GRAV01                                  |
|                                        | Sampli             | ing Parameter: Air Vol               | ume 947.5 L          | Analyzed: 11/12/2020 (271348)                       |
| Analyte                                | Result (mg/sample) | Result (mg/m³)                       | RL (mg/sample)       |                                                     |
| Respirable Dust                        | <0.020             | <0.021                               | 0.020                |                                                     |
| Method: NIOSH 7500 Mod.                | Sampl              | Media: PVC Filing Parameter: Air Vol |                      | Instrument: XRAY01<br>Analyzed: 11/13/2020 (271448) |
| Analyte                                | Result (ug/sample) | Result (ug/m³)                       | RL (ug/sample)       |                                                     |
| Quartz                                 | <5.0               | <5.3                                 | 5.0                  |                                                     |
| Cristobalite                           | <5.0               | <5.3                                 | 5.0                  |                                                     |
| Olisiopalite                           | <5.0               | ٧٥.٥                                 | 9.0                  |                                                     |
| Tridymite                              | <20                | <21                                  | 20                   |                                                     |

| Sample ID: <b>40163</b>                |                                |                                          |                      | Collected: 11/04/2020                               |
|----------------------------------------|--------------------------------|------------------------------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031264014                     | 5                              | Sampling Location: LA                    | Fire                 | Received: 11/06/2020                                |
| Method: NIOSH 0600 Mod., MW PVC Filter |                                | Media: PVC Fi                            | ter                  | Instrument: GRAV01                                  |
|                                        | Sampl                          | ing Parameter: Air Vol                   | ume 935 L            | Analyzed: 11/12/2020 (271348)                       |
| Analyte                                | Result (mg/sample)             | Result (mg/m³)                           | RL (mg/sample)       |                                                     |
| Respirable Dust                        | 0.040                          | 0.043                                    | 0.020                |                                                     |
|                                        |                                |                                          |                      |                                                     |
| Method: NIOSH 7500 Mod.                | Sampl                          | Media: PVC Fi<br>ing Parameter: Air Vol  |                      | Instrument: XRAY01<br>Analyzed: 11/13/2020 (271448) |
| Method: NIOSH 7500 Mod.  Analyte       | Sampl<br>Result<br>(ug/sample) |                                          |                      |                                                     |
|                                        | Result                         | ing Parameter: Air Vol                   | ume 935 L            | Analyzed: 11/13/2020 (271448)                       |
| Analyte                                | Result<br>(ug/sample)          | ing Parameter: Air Vol<br>Result (ug/m³) | me 935 L  Result (%) | Analyzed: 11/13/2020 (271448)  RL (ug/sample)       |
| Analyte Quartz                         | Result (ug/sample) <5.0        | Result (ug/m³) <5.3                      | Result (%) <13       | Analyzed: 11/13/2020 (271448)  RL (ug/sample)  5.0  |

#### **Comments**

Workorder: 2031264

Amended(12/16/2020): Report amended to include lead data per client request.

### **Report Authorization** (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method                         | Analyst                                | Peer Review                                  |
|--------------------------------|----------------------------------------|----------------------------------------------|
| NIOSH 0600 Mod., MW PVC Filter | /S/ Rex Bagley<br>11/12/2020 13:37     | /S/ Emilee Sandoval<br>11/12/2020 15:24      |
| NIOSH 7500 Mod.                | /S/ Kim Clymer<br>11/13/2020 17:44     | /S/ Paul M. Megerdichian<br>11/13/2020 18:31 |
| NIOSH 9102 Mod, Ghost Wipe     | /S/ Peter P. Steen<br>12/16/2020 09:27 | /S/ Rex Bagley<br>11/11/2020 15:17           |

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#### Amended-20201216

Workorder: **34-2031264** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700
960 W Levoy Drive Email: alslt.lab@ALSGlobal.com

Salt Lake City, Utah 84123 Web: www.alsslc.com

#### **General Lab Comments**

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L20-58                | http://www.pilabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.





| - | 1. REGULAR Status                                      | 2031264         |
|---|--------------------------------------------------------|-----------------|
|   | RUSH Status Requested - ADDITIONAL RESULTS REQUIRED BY | CHARGE          |
|   | DA                                                     | ATE             |
|   |                                                        | SEMBING CAMPLES |

| 5                                                                                 |                                   |                  |                    | 1             | -           | ested - ADDITIONAL CH<br>ED BY | ARGE       |              |
|-----------------------------------------------------------------------------------|-----------------------------------|------------------|--------------------|---------------|-------------|--------------------------------|------------|--------------|
| AL                                                                                | 3                                 | •                |                    |               |             | DATE                           |            | ADI EC       |
| `                                                                                 |                                   |                  | ler No             |               |             | _T LAKE PRIOR TO SEN<br>No.    | IDING SAN  | IFLES        |
|                                                                                   | Date 11/05/2020 Purchase Order No |                  |                    |               | •           | roject Manager: J              | 1011       | und          |
| Address: 37001                                                                    |                                   |                  |                    |               |             | ,                              | .1910      |              |
| Miscion VI                                                                        |                                   |                  |                    |               |             | ng Site                        | a fi       | r 0          |
| Person to Contact:                                                                |                                   |                  |                    |               |             |                                |            |              |
|                                                                                   |                                   |                  |                    |               |             | ial Process:  f Collection     | 1/200      | 7 A          |
| Telephone (94)4                                                                   |                                   |                  |                    |               |             | ,                              |            |              |
| Fax Telephone ( )                                                                 | (1) (2)                           | 10 / 1-          | (a) + much         | hade a co     | Time C      | Collected                      |            | annua        |
|                                                                                   |                                   |                  |                    | rancones.     |             |                                |            |              |
| Billing Address (if different                                                     | nt from                           | above)           |                    |               |             | of Custody No.:                |            |              |
|                                                                                   | ,                                 |                  |                    |               | 6. How di   | d you first learn about AL     | S?         |              |
|                                                                                   |                                   |                  |                    |               |             |                                |            |              |
|                                                                                   |                                   |                  |                    |               |             | W                              |            |              |
| 7. REQUEST FOR ANALY                                                              | 'SES                              |                  |                    |               |             |                                |            |              |
| Client Sample Number                                                              | Ma                                | atrix*           | Sample/Area Volume | ANALYSES REQU | JESTED - Us | e method number if known       | Units**    | Lab Comments |
| ENGS83-A-1 +                                                                      | 9h                                | st wi            | pe -               | MOSH          | 9102        | -arsenic                       | 1          | 12           |
| ENG-558-A-01                                                                      | •                                 | t                |                    |               | 1           |                                | í          |              |
| ENG159-A-1:                                                                       |                                   |                  |                    |               |             |                                |            |              |
| ENG-583-A-02                                                                      | A                                 |                  | g                  |               |             |                                |            |              |
| A-blank 1                                                                         |                                   |                  |                    |               |             |                                |            |              |
| Eng-168-A-01                                                                      | ,                                 |                  | ,                  |               |             |                                |            |              |
| Eng-558-A-0                                                                       | 2'-                               | <u></u>          |                    |               | سله         |                                |            |              |
| 40203,                                                                            | PV                                | ro_              | 1055 L             | NIOSH 750     | 10 + N(C    | 15H 0600 8798ta                | 5          | 5            |
| 40204'                                                                            | 1                                 |                  | 1042.5 L           |               |             |                                | 5          |              |
| 40174'                                                                            |                                   |                  | 982.5 L            |               |             |                                | 5          |              |
| 40193                                                                             |                                   |                  | 785 L              |               |             |                                | 5          |              |
| 40183                                                                             |                                   |                  |                    |               |             |                                | 1          |              |
| 40173 .                                                                           |                                   |                  | 947.5 L            |               |             |                                | 5          |              |
| 49631                                                                             |                                   |                  | 935 L              |               |             |                                | 5          | <del>-</del> |
| <ul> <li>* Specify: Solid sorbent to</li> <li>** 1. μg/sample 2. mg/m²</li> </ul> |                                   |                  |                    |               |             | ood; Urine; Tissue; Soil;      |            |              |
| Comments                                                                          | 3, ρ                              | рт 4.            | % 5. µg/m 6        | (other) Pie   | ase maica   | te one or more units in th     | e column e | nuiled Omis  |
| Comments                                                                          |                                   | V I NORTH MARKET | WAID.              |               |             |                                |            |              |
|                                                                                   |                                   |                  |                    |               |             |                                |            |              |
| Possible Contamination an                                                         | d/or Ch                           | emical           | Hazards            |               |             |                                |            |              |
| 7. Chain of Custody (Opt                                                          | ional)                            |                  |                    |               |             | 111111                         |            | 1.66         |
| Relinquished by                                                                   |                                   | <u>/\_</u>       | V                  |               | _Date/Time  | · 11/05/200                    | 10         | 1500         |
| Received by                                                                       | /ww/                              | رس               | Xussell            |               | Date/Time   | 11-00-20                       | 9          | 10           |
| Relinquished by                                                                   |                                   | (                |                    |               | _Date/Time  |                                |            |              |
| Received by                                                                       |                                   |                  |                    |               | Date/Time   | e                              |            |              |



Report Date: November 17, 2020

Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Stephanie Vivanco

27001 La Paz Road, Suite 260

Mission Viejo, CA 92691

**ToxStrategies** 

| Sample ID: N822LA-01   |                       |                                              | Collected: 11/03/2020                               |
|------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269001     | Sa                    | ampling Location: LA Fire                    | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Naphthalene            | <0.50                 | 0.50                                         |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                         |                                                     |
| Acenaphthene           | <0.50                 | 0.50                                         |                                                     |
| Fluorene               | <0.50                 | 0.50                                         |                                                     |
| Phenanthrene           | <0.50                 | 0.50                                         |                                                     |
| Anthracene             | <0.50                 | 0.50                                         |                                                     |
| Fluoranthene           | <0.50                 | 0.50                                         |                                                     |
| Pyrene                 | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                         |                                                     |
| Chrysene               | <0.50                 | 0.50                                         |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                         |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                         |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                         |                                                     |
| Benzo(g,h,i)perylene   | <0.50                 | 0.50                                         |                                                     |

| Sample ID: N120LA-01 |                       |                                              | Collected: 11/03/2020                               |
|----------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269002   | Sa                    | mpling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528   | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte              | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Naphthalene          | <0.50                 | 0.50                                         |                                                     |
| Acenaphthylene       | <0.50                 | 0.50                                         |                                                     |
| Acenaphthene         | <0.50                 | 0.50                                         |                                                     |

### **Results Continued on Next Page**

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: N120LA-01   |                       |                                              | Collected: 11/03/2020                               |
|------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269002     | Sa                    | ampling Location: LA Fire                    | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Fluorene               | < 0.50                | 0.50                                         |                                                     |
| Phenanthrene           | <0.50                 | 0.50                                         |                                                     |
| Anthracene             | < 0.50                | 0.50                                         |                                                     |
| Fluoranthene           | < 0.50                | 0.50                                         |                                                     |
| Pyrene                 | < 0.50                | 0.50                                         |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                         |                                                     |
| Chrysene               | < 0.50                | 0.50                                         |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                         |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                         |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                         |                                                     |
| Benzo(g,h,i)perylene   | <0.50                 | 0.50                                         |                                                     |
|                        |                       |                                              |                                                     |

| Sample ID: N120LA-02   |             |                                  | Collected: 11/03/2020         |
|------------------------|-------------|----------------------------------|-------------------------------|
| Lab ID: 2031269003     | Sa          | ampling Location: LA Fire        | Received: 11/06/2020          |
| Method: NIOSH 5528     |             | Media: Wipe                      | Instrument: 5975-B            |
|                        | Samplin     | g Parameter: Volume Not Provided | Analyzed: 11/13/2020 (271392) |
|                        | Result      |                                  |                               |
| Analyte                | (ug/sample) | RL (ug/sample)                   |                               |
| Naphthalene            | <0.50       | 0.50                             |                               |
| Acenaphthylene         | <0.50       | 0.50                             |                               |
| Acenaphthene           | <0.50       | 0.50                             |                               |
| Fluorene               | < 0.50      | 0.50                             |                               |
| Phenanthrene           | <0.50       | 0.50                             |                               |
| Anthracene             | <0.50       | 0.50                             |                               |
| Fluoranthene           | <0.50       | 0.50                             |                               |
| Pyrene                 | <0.50       | 0.50                             |                               |
| Benzo(a)anthracene     | <0.50       | 0.50                             |                               |
| Chrysene               | < 0.50      | 0.50                             |                               |
| Benzo(b)fluoranthene   | < 0.50      | 0.50                             |                               |
| Benzo(k)fluoranthene   | <0.50       | 0.50                             |                               |
| Benzo(a)pyrene         | <0.50       | 0.50                             |                               |
| Indeno(1,2,3-cd)pyrene | <0.50       | 0.50                             |                               |
| Dibenzo(a,h)anthracene | <0.50       | 0.50                             |                               |
| Benzo(g,h,i)perylene   | <0.50       | 0.50                             |                               |
|                        |             |                                  |                               |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: N190LA-01   |                       |                                                | Collected: 11/03/2020                               |
|------------------------|-----------------------|------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269004     | Sa                    | ampling Location: LA Fire                      | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe  ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                 |                                                     |
| Naphthalene            | < 0.50                | 0.50                                           |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                           |                                                     |
| Acenaphthene           | < 0.50                | 0.50                                           |                                                     |
| Fluorene               | <0.50                 | 0.50                                           |                                                     |
| Phenanthrene           | < 0.50                | 0.50                                           |                                                     |
| Anthracene             | <0.50                 | 0.50                                           |                                                     |
| Fluoranthene           | < 0.50                | 0.50                                           |                                                     |
| Pyrene                 | <0.50                 | 0.50                                           |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                           |                                                     |
| Chrysene               | <0.50                 | 0.50                                           |                                                     |
| Benzo(b)fluoranthene   | < 0.50                | 0.50                                           |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                           |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                           |                                                     |
| Indeno(1,2,3-cd)pyrene | < 0.50                | 0.50                                           |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                           |                                                     |
| Benzo(g,h,i)perylene   | < 0.50                | 0.50                                           |                                                     |
|                        |                       |                                                |                                                     |

| Sample ID: N822LA-03   |                       |                                              | Collected: 11/03/2020                               |
|------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269005     | Sa                    | mpling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Naphthalene            | <0.50                 | 0.50                                         |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                         |                                                     |
| Acenaphthene           | <0.50                 | 0.50                                         |                                                     |
| Fluorene               | <0.50                 | 0.50                                         |                                                     |
| Phenanthrene           | <0.50                 | 0.50                                         |                                                     |
| Anthracene             | <0.50                 | 0.50                                         |                                                     |
| Fluoranthene           | <0.50                 | 0.50                                         |                                                     |
| Pyrene                 | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                         |                                                     |
| Chrysene               | <0.50                 | 0.50                                         |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                         |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                         |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                         |                                                     |

#### **Results Continued on Next Page**

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: N822LA-03 Collected: 11/03/2020 Lab ID: 2031269005 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271392) Result **Analyte** (ug/sample) RL (ug/sample)  $Benzo(g,h,i) \\ perylene$ < 0.50 0.50

| nple ID: N14LA-03  |                    |                               | Collected: 11/03/2020             |
|--------------------|--------------------|-------------------------------|-----------------------------------|
| Lab ID: 2031269006 | Sa                 | ampling Location: LA Fire     | Received: 11/06/2020              |
| od: NIOSH 5528     |                    | Media: Wipe                   | Instrument: 5975-B                |
|                    | Sampling           | g Parameter: Volume Not Provi | ded Analyzed: 11/13/2020 (271392) |
| rte                | Result (ug/sample) | RL (ug/sample)                |                                   |
| thalene            | <0.50              | 0.50                          |                                   |
| aphthylene         | <0.50              | 0.50                          |                                   |
| aphthene           | <0.50              | 0.50                          |                                   |
| ene                | <0.50              | 0.50                          |                                   |
| anthrene           | <0.50              | 0.50                          |                                   |
| acene              | <0.50              | 0.50                          |                                   |
| anthene            | <0.50              | 0.50                          |                                   |
| e                  | <0.50              | 0.50                          |                                   |
| o(a)anthracene     | <0.50              | 0.50                          |                                   |
| sene               | <0.50              | 0.50                          |                                   |
| o(b)fluoranthene   | <0.50              | 0.50                          |                                   |
| o(k)fluoranthene   | <0.50              | 0.50                          |                                   |
| o(a)pyrene         | <0.50              | 0.50                          |                                   |
| o(1,2,3-cd)pyrene  | <0.50              | 0.50                          |                                   |
| zo(a,h)anthracene  | <0.50              | 0.50                          |                                   |
| o(g,h,i)perylene   | <0.50              | 0.50                          |                                   |
| zo(a,h)anthracene  | <0.50              | 0.50                          |                                   |

| Sample ID: N822LA-02 |                                                     |                           | Collected: 11/03/2020                                |
|----------------------|-----------------------------------------------------|---------------------------|------------------------------------------------------|
| Lab ID: 2031269007   | Sa                                                  | ampling Location: LA Fire | Received: 11/06/2020                                 |
| Method: NIOSH 5528   | Media: Wipe Sampling Parameter: Volume Not Provided |                           | Instrument: 5975-B ded Analyzed: 11/13/2020 (271392) |
| Analyte              | Result<br>(ug/sample)                               | RL (ug/sample)            |                                                      |
| Naphthalene          | <0.50                                               | 0.50                      |                                                      |
| Acenaphthylene       | <0.50                                               | 0.50                      |                                                      |
| Acenaphthene         | <0.50                                               | 0.50                      |                                                      |
| Fluorene             | <0.50                                               | 0.50                      |                                                      |
| Phenanthrene         | <0.50                                               | 0.50                      |                                                      |
| Anthracene           | <0.50                                               | 0.50                      |                                                      |
| Fluoranthene         | <0.50                                               | 0.50                      |                                                      |

#### **Results Continued on Next Page**



Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: N822LA-02   |                       |                                                | Collected: 11/03/2020                            |
|------------------------|-----------------------|------------------------------------------------|--------------------------------------------------|
| Lab ID: 2031269007     | Sa                    | mpling Location: LA Fire                       | Received: 11/06/2020                             |
| Method: NIOSH 5528     | Samplin               | Media: Wipe<br>g Parameter: Volume Not Provide | Instrument: 5975-B Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                 |                                                  |
| Pyrene                 | <0.50                 | 0.50                                           |                                                  |
| Benzo(a)anthracene     | <0.50                 | 0.50                                           |                                                  |
| Chrysene               | <0.50                 | 0.50                                           |                                                  |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                           |                                                  |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                           |                                                  |
| Benzo(a)pyrene         | <0.50                 | 0.50                                           |                                                  |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                           |                                                  |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                           |                                                  |
| Benzo(g,h,i)perylene   | <0.50                 | 0.50                                           |                                                  |

| Sample ID: N120LA-03   |                       |                                               | Collected: 11/03/2020                               |
|------------------------|-----------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269008     | Sa                    | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe  g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene            | <0.50                 | 0.50                                          |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                          |                                                     |
| Acenaphthene           | <0.50                 | 0.50                                          |                                                     |
| Fluorene               | <0.50                 | 0.50                                          |                                                     |
| Phenanthrene           | <0.50                 | 0.50                                          |                                                     |
| Anthracene             | <0.50                 | 0.50                                          |                                                     |
| Fluoranthene           | <0.50                 | 0.50                                          |                                                     |
| Pyrene                 | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                          |                                                     |
| Chrysene               | <0.50                 | 0.50                                          |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                          |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                          |                                                     |
| Benzo(g,h,i)perylene   | <0.50                 | 0.50                                          |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: HM-Blank-PAH |                            |                                                | Collected: 11/03/2020                                |
|-------------------------|----------------------------|------------------------------------------------|------------------------------------------------------|
| Lab ID: 2031269009      | Sampling Location: LA Fire |                                                | Received: 11/06/2020                                 |
| Method: NIOSH 5528      | Samplin                    | Media: Wipe<br>g Parameter: Volume Not Applica | Instrument: 5975-B ble Analyzed: 11/13/2020 (271392) |
| Analyte                 | Result<br>(ug/sample)      | RL (ug/sample)                                 |                                                      |
| Naphthalene             | <0.50                      | 0.50                                           |                                                      |
| Acenaphthylene          | <0.50                      | 0.50                                           |                                                      |
| Acenaphthene            | <0.50                      | 0.50                                           |                                                      |
| Fluorene                | <0.50                      | 0.50                                           |                                                      |
| Phenanthrene            | <0.50                      | 0.50                                           |                                                      |
| Anthracene              | <0.50                      | 0.50                                           |                                                      |
| Fluoranthene            | <0.50                      | 0.50                                           |                                                      |
| Pyrene                  | <0.50                      | 0.50                                           |                                                      |
| Benzo(a)anthracene      | < 0.50                     | 0.50                                           |                                                      |
| Chrysene                | <0.50                      | 0.50                                           |                                                      |
| Benzo(b)fluoranthene    | < 0.50                     | 0.50                                           |                                                      |
| Benzo(k)fluoranthene    | <0.50                      | 0.50                                           |                                                      |
| Benzo(a)pyrene          | <0.50                      | 0.50                                           |                                                      |
| Indeno(1,2,3-cd)pyrene  | <0.50                      | 0.50                                           |                                                      |
| Dibenzo(a,h)anthracene  | <0.50                      | 0.50                                           |                                                      |
| Benzo(g,h,i)perylene    | <0.50                      | 0.50                                           |                                                      |

| Sample ID: N14LA-02    |                       |                                                | Collected: 11/03/2020                            |
|------------------------|-----------------------|------------------------------------------------|--------------------------------------------------|
| Lab ID: 2031269010     | Sa                    | mpling Location: LA Fire                       | Received: 11/06/2020                             |
| Method: NIOSH 5528     | Samplin               | Media: Wipe<br>g Parameter: Volume Not Provide | Instrument: 5975-B Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                 |                                                  |
| Naphthalene            | <0.50                 | 0.50                                           |                                                  |
| Acenaphthylene         | <0.50                 | 0.50                                           |                                                  |
| Acenaphthene           | <0.50                 | 0.50                                           |                                                  |
| Fluorene               | <0.50                 | 0.50                                           |                                                  |
| Phenanthrene           | <0.50                 | 0.50                                           |                                                  |
| Anthracene             | <0.50                 | 0.50                                           |                                                  |
| Fluoranthene           | <0.50                 | 0.50                                           |                                                  |
| Pyrene                 | <0.50                 | 0.50                                           |                                                  |
| Benzo(a)anthracene     | <0.50                 | 0.50                                           |                                                  |
| Chrysene               | <0.50                 | 0.50                                           |                                                  |
| Benzo(b)fluoranthene   | < 0.50                | 0.50                                           |                                                  |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                           |                                                  |
| Benzo(a)pyrene         | <0.50                 | 0.50                                           |                                                  |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                           |                                                  |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                           |                                                  |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: N14LA-02 Collected: 11/03/2020 Lab ID: 2031269010 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271392) Result **Analyte** (ug/sample) RL (ug/sample) < 0.50 0.50 Benzo(g,h,i)perylene

| Sample ID: N14LA-01    |                    |                                               | Collected: 11/03/2020                               |
|------------------------|--------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269011     | Sa                 | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplir            | Media: Wipe ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result (ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene            | <0.50              | 0.50                                          |                                                     |
| Acenaphthylene         | <0.50              | 0.50                                          |                                                     |
| Acenaphthene           | <0.50              | 0.50                                          |                                                     |
| Fluorene               | <0.50              | 0.50                                          |                                                     |
| Phenanthrene           | <0.50              | 0.50                                          |                                                     |
| Anthracene             | <0.50              | 0.50                                          |                                                     |
| Fluoranthene           | < 0.50             | 0.50                                          |                                                     |
| Pyrene                 | <0.50              | 0.50                                          |                                                     |
| Benzo(a)anthracene     | <0.50              | 0.50                                          |                                                     |
| Chrysene               | <0.50              | 0.50                                          |                                                     |
| Benzo(b)fluoranthene   | <0.50              | 0.50                                          |                                                     |
| Benzo(k)fluoranthene   | <0.50              | 0.50                                          |                                                     |
| Benzo(a)pyrene         | <0.50              | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50              | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene | <0.50              | 0.50                                          |                                                     |
| Benzo(g,h,i)perylene   | < 0.50             | 0.50                                          |                                                     |

| Sample ID: N190LA-02 |                    |                                                 | Collected: 11/03/2020                               |
|----------------------|--------------------|-------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269012   | Sa                 | mpling Location: LA Fire                        | Received: 11/06/2020                                |
| Method: NIOSH 5528   | Samplin            | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte              | Result (ug/sample) | RL (ug/sample)                                  |                                                     |
| Naphthalene          | < 0.50             | 0.50                                            |                                                     |
| Acenaphthylene       | <0.50              | 0.50                                            |                                                     |
| Acenaphthene         | <0.50              | 0.50                                            |                                                     |
| Fluorene             | <0.50              | 0.50                                            |                                                     |
| Phenanthrene         | <0.50              | 0.50                                            |                                                     |
| Anthracene           | <0.50              | 0.50                                            |                                                     |
| Fluoranthene         | <0.50              | 0.50                                            |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Collected: 11/03/2020 Sample ID: N190LA-02 Lab ID: 2031269012 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271392) Result **Analyte** (ug/sample) RL (ug/sample) Pyrene < 0.50 0.50 Benzo(a)anthracene < 0.50 0.50 Chrysene < 0.50 0.50 Benzo(b)fluoranthene < 0.50 0.50 Benzo(k)fluoranthene < 0.50 0.50 < 0.50 Benzo(a)pyrene 0.50 Indeno(1,2,3-cd)pyrene < 0.50 0.50 Dibenzo(a,h)anthracene < 0.50 0.50 Benzo(g,h,i)perylene < 0.50 0.50

| Sample ID: N190LA-03   |             |                                  | Collected: 11/03/2020         |
|------------------------|-------------|----------------------------------|-------------------------------|
| Lab ID: 2031269013     | Sa          | ampling Location: LA Fire        | Received: 11/06/2020          |
| Method: NIOSH 5528     |             | Media: Wipe                      | Instrument: 5975-B            |
|                        | Samplin     | g Parameter: Volume Not Provided | Analyzed: 11/13/2020 (271392) |
|                        | Result      |                                  |                               |
| Analyte                | (ug/sample) | RL (ug/sample)                   |                               |
| Naphthalene            | <0.50       | 0.50                             |                               |
| Acenaphthylene         | < 0.50      | 0.50                             |                               |
| Acenaphthene           | < 0.50      | 0.50                             |                               |
| Fluorene               | < 0.50      | 0.50                             |                               |
| Phenanthrene           | < 0.50      | 0.50                             |                               |
| Anthracene             | <0.50       | 0.50                             |                               |
| Fluoranthene           | < 0.50      | 0.50                             |                               |
| Pyrene                 | < 0.50      | 0.50                             |                               |
| Benzo(a)anthracene     | < 0.50      | 0.50                             |                               |
| Chrysene               | < 0.50      | 0.50                             |                               |
| Benzo(b)fluoranthene   | < 0.50      | 0.50                             |                               |
| Benzo(k)fluoranthene   | < 0.50      | 0.50                             |                               |
| Benzo(a)pyrene         | <0.50       | 0.50                             |                               |
| Indeno(1,2,3-cd)pyrene | <0.50       | 0.50                             |                               |
| Dibenzo(a,h)anthracene | <0.50       | 0.50                             |                               |
| Benzo(g,h,i)perylene   | <0.50       | 0.50                             |                               |
|                        |             |                                  |                               |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: ENG-558-PAH-01 |                       |                                              | Collected: 11/04/2020                               |
|---------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269014        | Sa                    | ampling Location: LA Fire                    | Received: 11/06/2020                                |
| Method: NIOSH 5528        | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                   | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Naphthalene               | <0.50                 | 0.50                                         |                                                     |
| Acenaphthylene            | <0.50                 | 0.50                                         |                                                     |
| Acenaphthene              | <0.50                 | 0.50                                         |                                                     |
| Fluorene                  | <0.50                 | 0.50                                         |                                                     |
| Phenanthrene              | <0.50                 | 0.50                                         |                                                     |
| Anthracene                | <0.50                 | 0.50                                         |                                                     |
| Fluoranthene              | <0.50                 | 0.50                                         |                                                     |
| Pyrene                    | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)anthracene        | <0.50                 | 0.50                                         |                                                     |
| Chrysene                  | <0.50                 | 0.50                                         |                                                     |
| Benzo(b)fluoranthene      | <0.50                 | 0.50                                         |                                                     |
| Benzo(k)fluoranthene      | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)pyrene            | <0.50                 | 0.50                                         |                                                     |
| Indeno(1,2,3-cd)pyrene    | <0.50                 | 0.50                                         |                                                     |
| Dibenzo(a,h)anthracene    | <0.50                 | 0.50                                         |                                                     |
| Benzo(g,h,i)perylene      | <0.50                 | 0.50                                         |                                                     |

| Sample ID: ENG-159-PAH-01 |                       |                                               | Collected: 11/04/2020                               |
|---------------------------|-----------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269015        | Sa                    | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528        | Samplir               | Media: Wipe ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                   | Result<br>(ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene               | <0.50                 | 0.50                                          |                                                     |
| Acenaphthylene            | <0.50                 | 0.50                                          |                                                     |
| Acenaphthene              | <0.50                 | 0.50                                          |                                                     |
| Fluorene                  | <0.50                 | 0.50                                          |                                                     |
| Phenanthrene              | <0.50                 | 0.50                                          |                                                     |
| Anthracene                | <0.50                 | 0.50                                          |                                                     |
| Fluoranthene              | <0.50                 | 0.50                                          |                                                     |
| Pyrene                    | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)anthracene        | <0.50                 | 0.50                                          |                                                     |
| Chrysene                  | <0.50                 | 0.50                                          |                                                     |
| Benzo(b)fluoranthene      | <0.50                 | 0.50                                          |                                                     |
| Benzo(k)fluoranthene      | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)pyrene            | <0.50                 | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene    | <0.50                 | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene    | <0.50                 | 0.50                                          |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: ENG-159-PAH-01 Collected: 11/04/2020 Lab ID: 2031269015 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271392) Result **Analyte** (ug/sample) RL (ug/sample) Benzo(g,h,i)perylene < 0.50 0.50

| Sample ID: ENG-558-PAH-02 |                            |                                               | Collected: 11/04/2020                               |
|---------------------------|----------------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269016        | Sampling Location: LA Fire |                                               | Received: 11/06/2020                                |
| Method: NIOSH 5528        | Samplin                    | Media: Wipe ag Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                   | Result (ug/sample)         | RL (ug/sample)                                |                                                     |
| Naphthalene               | <0.50                      | 0.50                                          |                                                     |
| Acenaphthylene            | <0.50                      | 0.50                                          |                                                     |
| Acenaphthene              | <0.50                      | 0.50                                          |                                                     |
| Fluorene                  | <0.50                      | 0.50                                          |                                                     |
| Phenanthrene              | <0.50                      | 0.50                                          |                                                     |
| Anthracene                | <0.50                      | 0.50                                          |                                                     |
| Fluoranthene              | <0.50                      | 0.50                                          |                                                     |
| Pyrene                    | <0.50                      | 0.50                                          |                                                     |
| Benzo(a)anthracene        | <0.50                      | 0.50                                          |                                                     |
| Chrysene                  | <0.50                      | 0.50                                          |                                                     |
| Benzo(b)fluoranthene      | <0.50                      | 0.50                                          |                                                     |
| Benzo(k)fluoranthene      | <0.50                      | 0.50                                          |                                                     |
| Benzo(a)pyrene            | <0.50                      | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene    | <0.50                      | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene    | <0.50                      | 0.50                                          |                                                     |
| Benzo(g,h,i)perylene      | <0.50                      | 0.50                                          |                                                     |

| Sample ID: ENG-583-PAH-01 |                    |                                                 | Collected: 11/04/2020                               |
|---------------------------|--------------------|-------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269017        | Sa                 | mpling Location: LA Fire                        | Received: 11/06/2020                                |
| Method: NIOSH 5528        | Samplin            | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                   | Result (ug/sample) | RL (ug/sample)                                  |                                                     |
| Naphthalene               | <0.50              | 0.50                                            |                                                     |
| Acenaphthylene            | <0.50              | 0.50                                            |                                                     |
| Acenaphthene              | <0.50              | 0.50                                            |                                                     |
| Fluorene                  | <0.50              | 0.50                                            |                                                     |
| Phenanthrene              | <0.50              | 0.50                                            |                                                     |
| Anthracene                | <0.50              | 0.50                                            |                                                     |
| Fluoranthene              | <0.50              | 0.50                                            |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

Sample ID: ENG-583-PAH-01 Collected: 11/04/2020 Lab ID: 2031269017 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271392) Result **Analyte** (ug/sample) RL (ug/sample) Pyrene < 0.50 0.50 Benzo(a)anthracene < 0.50 0.50 Chrysene < 0.50 0.50 Benzo(b)fluoranthene < 0.50 0.50 Benzo(k)fluoranthene < 0.50 0.50 < 0.50 Benzo(a)pyrene 0.50 Indeno(1,2,3-cd)pyrene < 0.50 0.50 Dibenzo(a,h)anthracene < 0.50 0.50 Benzo(g,h,i)perylene < 0.50 0.50

| Sample ID: ENG-583-PAH-02 |                       |                                  | Collected: 11/04/2020         |
|---------------------------|-----------------------|----------------------------------|-------------------------------|
| Lab ID: 2031269018        | Sa                    | impling Location: LA Fire        | Received: 11/06/2020          |
| Method: NIOSH 5528        |                       | Media: Wipe                      | Instrument: 5975-B            |
|                           | Samplin               | g Parameter: Volume Not Provided | Analyzed: 11/13/2020 (271392) |
| Analyte                   | Result<br>(ug/sample) | RL (ug/sample)                   |                               |
| Naphthalene               | <0.50                 | 0.50                             |                               |
| Acenaphthylene            | <0.50                 | 0.50                             |                               |
| Acenaphthene              | <0.50                 | 0.50                             |                               |
| Fluorene                  | <0.50                 | 0.50                             |                               |
| Phenanthrene              | <0.50                 | 0.50                             |                               |
| Anthracene                | <0.50                 | 0.50                             |                               |
| Fluoranthene              | <0.50                 | 0.50                             |                               |
| Pyrene                    | <0.50                 | 0.50                             |                               |
| Benzo(a)anthracene        | <0.50                 | 0.50                             |                               |
| Chrysene                  | <0.50                 | 0.50                             |                               |
| Benzo(b)fluoranthene      | <0.50                 | 0.50                             |                               |
| Benzo(k)fluoranthene      | <0.50                 | 0.50                             |                               |
| Benzo(a)pyrene            | <0.50                 | 0.50                             |                               |
| Indeno(1,2,3-cd)pyrene    | <0.50                 | 0.50                             |                               |
| Dibenzo(a,h)anthracene    | <0.50                 | 0.50                             |                               |
| Benzo(g,h,i)perylene      | <0.50                 | 0.50                             |                               |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: ENG-168-PAH-01 |                       |                                               | Collected: 11/04/2020                               |
|---------------------------|-----------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269019        | S                     | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528        | Samplir               | Media: Wipe ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                   | Result<br>(ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene               | <0.50                 | 0.50                                          |                                                     |
| Acenaphthylene            | <0.50                 | 0.50                                          |                                                     |
| Acenaphthene              | <0.50                 | 0.50                                          |                                                     |
| Fluorene                  | <0.50                 | 0.50                                          |                                                     |
| Phenanthrene              | < 0.50                | 0.50                                          |                                                     |
| Anthracene                | < 0.50                | 0.50                                          |                                                     |
| Fluoranthene              | < 0.50                | 0.50                                          |                                                     |
| Pyrene                    | < 0.50                | 0.50                                          |                                                     |
| Benzo(a)anthracene        | < 0.50                | 0.50                                          |                                                     |
| Chrysene                  | < 0.50                | 0.50                                          |                                                     |
| Benzo(b)fluoranthene      | < 0.50                | 0.50                                          |                                                     |
| Benzo(k)fluoranthene      | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)pyrene            | <0.50                 | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene    | <0.50                 | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene    | <0.50                 | 0.50                                          |                                                     |
| Benzo(g,h,i)perylene      | <0.50                 | 0.50                                          |                                                     |

| Sample ID: H-06        |                       |                                               | Collected: 11/04/2020                               |
|------------------------|-----------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269020     | Sa                    | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe ag Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271392) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene            | <0.50                 | 0.50                                          |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                          |                                                     |
| Acenaphthene           | <0.50                 | 0.50                                          |                                                     |
| Fluorene               | <0.50                 | 0.50                                          |                                                     |
| Phenanthrene           | <0.50                 | 0.50                                          |                                                     |
| Anthracene             | <0.50                 | 0.50                                          |                                                     |
| Fluoranthene           | <0.50                 | 0.50                                          |                                                     |
| Pyrene                 | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                          |                                                     |
| Chrysene               | <0.50                 | 0.50                                          |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                          |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                          |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: H-06 Collected: 11/04/2020 Lab ID: 2031269020 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271392) Result **Analyte** (ug/sample) RL (ug/sample) Benzo(g,h,i)perylene < 0.50 0.50

| Sample ID: <b>H-01</b> |             |                                  | Collected: 11/04/2020         |
|------------------------|-------------|----------------------------------|-------------------------------|
| Lab ID: 2031269021     | Sa          | ampling Location: LA Fire        | Received: 11/06/2020          |
| Method: NIOSH 5528     |             | Media: Wipe                      | Instrument: 5975-B            |
|                        | Samplin     | g Parameter: Volume Not Provided | Analyzed: 11/13/2020 (271394) |
|                        | Result      |                                  |                               |
| Analyte                | (ug/sample) | RL (ug/sample)                   |                               |
| Naphthalene            | <0.50       | 0.50                             |                               |
| Acenaphthylene         | <0.50       | 0.50                             | ·                             |
| Acenaphthene           | <0.50       | 0.50                             |                               |
| Fluorene               | <0.50       | 0.50                             |                               |
| Phenanthrene           | <0.50       | 0.50                             |                               |
| Anthracene             | <0.50       | 0.50                             |                               |
| Fluoranthene           | <0.50       | 0.50                             |                               |
| Pyrene                 | <0.50       | 0.50                             |                               |
| Benzo(a)anthracene     | <0.50       | 0.50                             |                               |
| Chrysene               | <0.50       | 0.50                             |                               |
| Benzo(b)fluoranthene   | <0.50       | 0.50                             |                               |
| Benzo(k)fluoranthene   | <0.50       | 0.50                             |                               |
| Benzo(a)pyrene         | <0.50       | 0.50                             |                               |
| Indeno(1,2,3-cd)pyrene | <0.50       | 0.50                             |                               |
| Dibenzo(a,h)anthracene | <0.50       | 0.50                             |                               |
| Benzo(g,h,i)perylene   | <0.50       | 0.50                             |                               |

| Sample ID: <b>H-03</b> |                                                     |                           | Collected: 11/04/2020                            |
|------------------------|-----------------------------------------------------|---------------------------|--------------------------------------------------|
| Lab ID: 2031269022     | Sa                                                  | ampling Location: LA Fire | Received: 11/06/2020                             |
| Method: NIOSH 5528     | Media: Wipe Sampling Parameter: Volume Not Provided |                           | Instrument: 5975-B Analyzed: 11/13/2020 (271394) |
| Analyte                | Result<br>(ug/sample)                               | RL (ug/sample)            |                                                  |
| Naphthalene            | < 0.50                                              | 0.50                      |                                                  |
| Acenaphthylene         | <0.50                                               | 0.50                      |                                                  |
| Acenaphthene           | <0.50                                               | 0.50                      |                                                  |
| Fluorene               | < 0.50                                              | 0.50                      |                                                  |
| Phenanthrene           | < 0.50                                              | 0.50                      |                                                  |
| Anthracene             | <0.50                                               | 0.50                      |                                                  |
| Fluoranthene           | <0.50                                               | 0.50                      |                                                  |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: H-03 Collected: 11/04/2020 Sampling Location: LA Fire Lab ID: 2031269022 Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/13/2020 (271394) Result **Analyte** (ug/sample) RL (ug/sample) Pyrene < 0.50 0.50 Benzo(a)anthracene < 0.50 0.50 Chrysene < 0.50 0.50 Benzo(b)fluoranthene < 0.50 0.50 Benzo(k)fluoranthene < 0.50 0.50 < 0.50 Benzo(a)pyrene 0.50 Indeno(1,2,3-cd)pyrene < 0.50 0.50 Dibenzo(a,h)anthracene < 0.50 0.50 Benzo(g,h,i)perylene < 0.50 0.50

| Sample ID: H-04        |                    |                                  | Collected: 11/04/2020         |
|------------------------|--------------------|----------------------------------|-------------------------------|
| Lab ID: 2031269023     | Sa                 | impling Location: LA Fire        | Received: 11/06/2020          |
| Method: NIOSH 5528     |                    | Media: Wipe                      | Instrument: 5975-B            |
|                        | Samplin            | g Parameter: Volume Not Provided | Analyzed: 11/13/2020 (271394) |
| Analyte                | Result (ug/sample) | RL (ug/sample)                   |                               |
| Naphthalene            | <0.50              | 0.50                             |                               |
| Acenaphthylene         | <0.50              | 0.50                             |                               |
| Acenaphthene           | <0.50              | 0.50                             |                               |
| Fluorene               | <0.50              | 0.50                             |                               |
| Phenanthrene           | <0.50              | 0.50                             |                               |
| Anthracene             | <0.50              | 0.50                             |                               |
| Fluoranthene           | <0.50              | 0.50                             |                               |
| Pyrene                 | <0.50              | 0.50                             |                               |
| Benzo(a)anthracene     | <0.50              | 0.50                             |                               |
| Chrysene               | <0.50              | 0.50                             |                               |
| Benzo(b)fluoranthene   | <0.50              | 0.50                             |                               |
| Benzo(k)fluoranthene   | <0.50              | 0.50                             |                               |
| Benzo(a)pyrene         | <0.50              | 0.50                             |                               |
| Indeno(1,2,3-cd)pyrene | <0.50              | 0.50                             |                               |
| Dibenzo(a,h)anthracene | <0.50              | 0.50                             |                               |
| Benzo(g,h,i)perylene   | <0.50              | 0.50                             |                               |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: H-05        |                       |                                               | Collected: 11/04/2020                               |
|------------------------|-----------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269024     | Sa                    | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplir               | Media: Wipe ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/13/2020 (271394) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene            | <0.50                 | 0.50                                          |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                          |                                                     |
| Acenaphthene           | < 0.50                | 0.50                                          |                                                     |
| Fluorene               | <0.50                 | 0.50                                          |                                                     |
| Phenanthrene           | < 0.50                | 0.50                                          |                                                     |
| Anthracene             | <0.50                 | 0.50                                          |                                                     |
| Fluoranthene           | < 0.50                | 0.50                                          |                                                     |
| Pyrene                 | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                          |                                                     |
| Chrysene               | <0.50                 | 0.50                                          |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                          |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                          |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                          |                                                     |
| Benzo(g,h,i)perylene   | <0.50                 | 0.50                                          |                                                     |

| Sample ID: H-02        |                       |                                                 | Collected: 11/04/2020                               |
|------------------------|-----------------------|-------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269025     | Sa                    | ampling Location: LA Fire                       | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe<br>g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/14/2020 (271394) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                                  |                                                     |
| Naphthalene            | <0.50                 | 0.50                                            |                                                     |
| Acenaphthylene         | <0.50                 | 0.50                                            |                                                     |
| Acenaphthene           | <0.50                 | 0.50                                            |                                                     |
| Fluorene               | <0.50                 | 0.50                                            |                                                     |
| Phenanthrene           | <0.50                 | 0.50                                            |                                                     |
| Anthracene             | <0.50                 | 0.50                                            |                                                     |
| Fluoranthene           | <0.50                 | 0.50                                            |                                                     |
| Pyrene                 | <0.50                 | 0.50                                            |                                                     |
| Benzo(a)anthracene     | <0.50                 | 0.50                                            |                                                     |
| Chrysene               | <0.50                 | 0.50                                            |                                                     |
| Benzo(b)fluoranthene   | <0.50                 | 0.50                                            |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                            |                                                     |
| Benzo(a)pyrene         | <0.50                 | 0.50                                            |                                                     |
| Indeno(1,2,3-cd)pyrene | <0.50                 | 0.50                                            |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                            |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: H-02 Collected: 11/04/2020 Lab ID: 2031269025 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/14/2020 (271394) Result **Analyte** (ug/sample) RL (ug/sample) < 0.50 0.50 Benzo(g,h,i)perylene

| Sample ID: <b>A49996</b> |                       |                                              | Collected: 11/03/2020                            |
|--------------------------|-----------------------|----------------------------------------------|--------------------------------------------------|
| Lab ID: 2031269026       | Sa                    | ampling Location: LA Fire                    | Received: 11/06/2020                             |
| Method: NIOSH 5528       | Samplin               | Media: Wipe ng Parameter: Volume Not Provide | Instrument: 5975-B Analyzed: 11/14/2020 (271394) |
| Analyte                  | Result<br>(ug/sample) | RL (ug/sample)                               |                                                  |
| Naphthalene              | <0.50                 | 0.50                                         |                                                  |
| Acenaphthylene           | <0.50                 | 0.50                                         |                                                  |
| Acenaphthene             | <0.50                 | 0.50                                         |                                                  |
| Fluorene                 | <0.50                 | 0.50                                         |                                                  |
| Phenanthrene             | <0.50                 | 0.50                                         |                                                  |
| Anthracene               | <0.50                 | 0.50                                         |                                                  |
| Fluoranthene             | <0.50                 | 0.50                                         |                                                  |
| Pyrene                   | <0.50                 | 0.50                                         |                                                  |
| Benzo(a)anthracene       | <0.50                 | 0.50                                         |                                                  |
| Chrysene                 | <0.50                 | 0.50                                         |                                                  |
| Benzo(b)fluoranthene     | <0.50                 | 0.50                                         |                                                  |
| Benzo(k)fluoranthene     | <0.50                 | 0.50                                         |                                                  |
| Benzo(a)pyrene           | <0.50                 | 0.50                                         |                                                  |
| Indeno(1,2,3-cd)pyrene   | <0.50                 | 0.50                                         |                                                  |
| Dibenzo(a,h)anthracene   | <0.50                 | 0.50                                         |                                                  |
| Benzo(g,h,i)perylene     | <0.50                 | 0.50                                         |                                                  |

| Sample ID: PAH-Blank |                    |                                            | Collected: 11/03/2020                                    |
|----------------------|--------------------|--------------------------------------------|----------------------------------------------------------|
| Lab ID: 2031269027   | Sa                 | mpling Location: LA Fire                   | Received: 11/06/2020                                     |
| Method: NIOSH 5528   | Samplin            | Media: Wipe<br>g Parameter: Volume Not App | Instrument: 5975-B Iicable Analyzed: 11/14/2020 (271394) |
| Analyte              | Result (ug/sample) | RL (ug/sample)                             |                                                          |
| Naphthalene          | <0.50              | 0.50                                       |                                                          |
| Acenaphthylene       | <0.50              | 0.50                                       |                                                          |
| Acenaphthene         | <0.50              | 0.50                                       |                                                          |
| Fluorene             | <0.50              | 0.50                                       |                                                          |
| Phenanthrene         | <0.50              | 0.50                                       |                                                          |
| Anthracene           | <0.50              | 0.50                                       |                                                          |
| Fluoranthene         | <0.50              | 0.50                                       |                                                          |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Collected: 11/03/2020 Sample ID: PAH-Blank Lab ID: 2031269027 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Applicable** Analyzed: 11/14/2020 (271394) Result **Analyte** (ug/sample) RL (ug/sample) Pyrene < 0.50 0.50 Benzo(a)anthracene < 0.50 0.50 Chrysene < 0.50 0.50 Benzo(b)fluoranthene < 0.50 0.50 Benzo(k)fluoranthene < 0.50 0.50 < 0.50 Benzo(a)pyrene 0.50 Indeno(1,2,3-cd)pyrene < 0.50 0.50 Dibenzo(a,h)anthracene < 0.50 0.50 Benzo(g,h,i)perylene < 0.50 0.50

| Sample ID: <b>A50421 ENG-21-4</b> |                       |                                  | Collected: 11/03/2020         |
|-----------------------------------|-----------------------|----------------------------------|-------------------------------|
| Lab ID: 2031269028                | Sa                    | ampling Location: LA Fire        | Received: 11/06/2020          |
| Method: NIOSH 5528                |                       | Media: Wipe                      | Instrument: 5975-B            |
|                                   | Samplin               | g Parameter: Volume Not Provided | Analyzed: 11/14/2020 (271394) |
| Analyte                           | Result<br>(ug/sample) | RL (ug/sample)                   |                               |
| Naphthalene                       | <0.50                 | 0.50                             |                               |
| Acenaphthylene                    | <0.50                 | 0.50                             |                               |
| Acenaphthene                      | <0.50                 | 0.50                             |                               |
| Fluorene                          | <0.50                 | 0.50                             |                               |
| Phenanthrene                      | <0.50                 | 0.50                             |                               |
| Anthracene                        | <0.50                 | 0.50                             |                               |
| Fluoranthene                      | <0.50                 | 0.50                             |                               |
| Pyrene                            | <0.50                 | 0.50                             |                               |
| Benzo(a)anthracene                | <0.50                 | 0.50                             |                               |
| Chrysene                          | < 0.50                | 0.50                             |                               |
| Benzo(b)fluoranthene              | <0.50                 | 0.50                             |                               |
| Benzo(k)fluoranthene              | <0.50                 | 0.50                             |                               |
| Benzo(a)pyrene                    | <0.50                 | 0.50                             |                               |
| Indeno(1,2,3-cd)pyrene            | <0.50                 | 0.50                             |                               |
| Dibenzo(a,h)anthracene            | <0.50                 | 0.50                             |                               |
| Benzo(g,h,i)perylene              | <0.50                 | 0.50                             |                               |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: <b>A5014 Q-24-5</b> |                    |                                               | Collected: 11/03/2020                               |
|--------------------------------|--------------------|-----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269029             | Sa                 | ampling Location: LA Fire                     | Received: 11/06/2020                                |
| Method: NIOSH 5528             | Samplin            | Media: Wipe ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/14/2020 (271394) |
| Analyte                        | Result (ug/sample) | RL (ug/sample)                                |                                                     |
| Naphthalene                    | <0.50              | 0.50                                          |                                                     |
| Acenaphthylene                 | <0.50              | 0.50                                          |                                                     |
| Acenaphthene                   | <0.50              | 0.50                                          |                                                     |
| Fluorene                       | <0.50              | 0.50                                          |                                                     |
| Phenanthrene                   | < 0.50             | 0.50                                          |                                                     |
| Anthracene                     | <0.50              | 0.50                                          |                                                     |
| Fluoranthene                   | <0.50              | 0.50                                          |                                                     |
| Pyrene                         | <0.50              | 0.50                                          |                                                     |
| Benzo(a)anthracene             | <0.50              | 0.50                                          |                                                     |
| Chrysene                       | <0.50              | 0.50                                          |                                                     |
| Benzo(b)fluoranthene           | < 0.50             | 0.50                                          |                                                     |
| Benzo(k)fluoranthene           | <0.50              | 0.50                                          |                                                     |
| Benzo(a)pyrene                 | <0.50              | 0.50                                          |                                                     |
| Indeno(1,2,3-cd)pyrene         | < 0.50             | 0.50                                          |                                                     |
| Dibenzo(a,h)anthracene         | <0.50              | 0.50                                          |                                                     |
| Benzo(g,h,i)perylene           | <0.50              | 0.50                                          |                                                     |

| Sample ID: ECTC-T-8    |                       |                                              | Collected: 11/03/2020                               |
|------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269030     | Sa                    | ampling Location: LA Fire                    | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/14/2020 (271394) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Naphthalene            | 1.8                   | 0.50                                         |                                                     |
| Acenaphthylene         | 5.6                   | 0.50                                         |                                                     |
| Acenaphthene           | <0.50                 | 0.50                                         |                                                     |
| Fluorene               | 2.0                   | 0.50                                         |                                                     |
| Phenanthrene           | 14                    | 0.50                                         |                                                     |
| Anthracene             | 3.0                   | 0.50                                         |                                                     |
| Fluoranthene           | 12                    | 0.50                                         |                                                     |
| Pyrene                 | 9.0                   | 0.50                                         |                                                     |
| Benzo(a)anthracene     | 4.8                   | 0.50                                         |                                                     |
| Chrysene               | 5.0                   | 0.50                                         |                                                     |
| Benzo(b)fluoranthene   | 10                    | 0.50                                         |                                                     |
| Benzo(k)fluoranthene   | <0.50                 | 0.50                                         |                                                     |
| Benzo(a)pyrene         | 4.5                   | 0.50                                         |                                                     |
| Indeno(1,2,3-cd)pyrene | 3.5                   | 0.50                                         |                                                     |
| Dibenzo(a,h)anthracene | 0.71                  | 0.50                                         |                                                     |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: ECTC-T-8 Collected: 11/03/2020 Lab ID: 2031269030 Sampling Location: LA Fire Received: 11/06/2020 Method: NIOSH 5528 Media: Wipe Instrument: 5975-B **Sampling Parameter: Volume Not Provided** Analyzed: 11/14/2020 (271394) Result **Analyte** (ug/sample) RL (ug/sample) Benzo(g,h,i)perylene 0.50 3.8

| Sample ID: ECTC-T-38   |                    |                                                | Collected: 11/03/2020                               |
|------------------------|--------------------|------------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269031     | Sa                 | ampling Location: LA Fire                      | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplir            | Media: Wipe  ng Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/14/2020 (271394) |
| Analyte                | Result (ug/sample) | RL (ug/sample)                                 |                                                     |
| Naphthalene            | <0.50              | 0.50                                           |                                                     |
| Acenaphthylene         | <0.50              | 0.50                                           |                                                     |
| Acenaphthene           | <0.50              | 0.50                                           |                                                     |
| Fluorene               | <0.50              | 0.50                                           |                                                     |
| Phenanthrene           | 1.5                | 0.50                                           |                                                     |
| Anthracene             | <0.50              | 0.50                                           |                                                     |
| Fluoranthene           | 1.8                | 0.50                                           |                                                     |
| Pyrene                 | 1.5                | 0.50                                           |                                                     |
| Benzo(a)anthracene     | 0.98               | 0.50                                           |                                                     |
| Chrysene               | 1.3                | 0.50                                           |                                                     |
| Benzo(b)fluoranthene   | 2.0                | 0.50                                           |                                                     |
| Benzo(k)fluoranthene   | 0.70               | 0.50                                           |                                                     |
| Benzo(a)pyrene         | 0.83               | 0.50                                           |                                                     |
| Indeno(1,2,3-cd)pyrene | 0.91               | 0.50                                           |                                                     |
| Dibenzo(a,h)anthracene | <0.50              | 0.50                                           |                                                     |
| Benzo(g,h,i)perylene   | 1.0                | 0.50                                           |                                                     |

| Sample ID: NCSO-04 |                    |                                              | Collected: 11/03/2020                                 |
|--------------------|--------------------|----------------------------------------------|-------------------------------------------------------|
| Lab ID: 2031269032 | Sa                 | ampling Location: LA Fire                    | Received: 11/06/2020                                  |
| Method: NIOSH 5528 | Samplin            | Media: Wipe ag Parameter: Volume Not Provide | Instrument: 5975-B<br>d Analyzed: 11/14/2020 (271394) |
| Analyte            | Result (ug/sample) | RL (ug/sample)                               |                                                       |
| Naphthalene        | <0.50              | 0.50                                         |                                                       |
| Acenaphthylene     | 1.3                | 0.50                                         |                                                       |
| Acenaphthene       | <0.50              | 0.50                                         |                                                       |
| Fluorene           | <0.50              | 0.50                                         |                                                       |
| Phenanthrene       | 5.5                | 0.50                                         |                                                       |
| Anthracene         | 1.0                | 0.50                                         |                                                       |
| Fluoranthene       | 7.8                | 0.50                                         |                                                       |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: NCSO-04     |                       |                                              | Collected: 11/03/2020                               |
|------------------------|-----------------------|----------------------------------------------|-----------------------------------------------------|
| Lab ID: 2031269032     | Sa                    | impling Location: LA Fire                    | Received: 11/06/2020                                |
| Method: NIOSH 5528     | Samplin               | Media: Wipe g Parameter: Volume Not Provided | Instrument: 5975-B<br>Analyzed: 11/14/2020 (271394) |
| Analyte                | Result<br>(ug/sample) | RL (ug/sample)                               |                                                     |
| Pyrene                 | 6.1                   | 0.50                                         |                                                     |
| Benzo(a)anthracene     | 3.4                   | 0.50                                         |                                                     |
| Chrysene               | 3.5                   | 0.50                                         |                                                     |
| Benzo(b)fluoranthene   | 4.8                   | 0.50                                         |                                                     |
| Benzo(k)fluoranthene   | 1.6                   | 0.50                                         |                                                     |
| Benzo(a)pyrene         | 3.0                   | 0.50                                         |                                                     |
| Indeno(1,2,3-cd)pyrene | 2.0                   | 0.50                                         |                                                     |
| Dibenzo(a,h)anthracene | <0.50                 | 0.50                                         |                                                     |
| Benzo(g,h,i)perylene   | 2.2                   | 0.50                                         |                                                     |

| Sample ID: <b>A295575</b> |                                                                |                      |                               | Collected: 11/03/2020 |  |
|---------------------------|----------------------------------------------------------------|----------------------|-------------------------------|-----------------------|--|
| Lab ID: 2031269033        | Sampling Location: LA Fire Received: 11/06/202                 |                      |                               |                       |  |
| Method: EPA TO-11A        | Media: SKC 500-100, UMEx100 Instrument: HPLC12 Passive Sampler |                      |                               |                       |  |
|                           | Sampling                                                       | g Parameter: Exposur | Analyzed: 11/11/2020 (271190) |                       |  |
| Analyte                   | Result<br>(ug/sample)                                          | Result (mg/m³)       | Result (ppm)                  | RL (ug/sample)        |  |
| Formaldehyde              | 0.27                                                           | 0.028                | 0.022                         | 0.15                  |  |
| Acetaldehyde              | 0.22                                                           | 0.027                | 0.015                         | 0.15                  |  |

| Sample ID: <b>A295583</b> | Collected: 11/03/2020                                          |                      |                               |      |  |  |
|---------------------------|----------------------------------------------------------------|----------------------|-------------------------------|------|--|--|
| Lab ID: 2031269034        | Sa                                                             | Received: 11/06/2020 |                               |      |  |  |
| Method: EPA TO-11A        | Media: SKC 500-100, UMEx100 Instrument: HPLC12 Passive Sampler |                      |                               |      |  |  |
|                           | Sampling                                                       | g Parameter: Exposur | Analyzed: 11/11/2020 (271190) |      |  |  |
| Analyte                   | Result<br>(ug/sample)                                          | Result (mg/m³)       | RL (ug/sample)                |      |  |  |
| Formaldehyde              | <0.15                                                          | NA                   | NA                            | 0.15 |  |  |
| Acetaldehyde              | <0.15                                                          | NA                   | NA                            | 0.15 |  |  |

| Sample ID: <b>A295581</b> |                                                                |                      |              | Collected: 11/03/2020         |  |
|---------------------------|----------------------------------------------------------------|----------------------|--------------|-------------------------------|--|
| Lab ID: 2031269035        | Sa                                                             | Received: 11/06/2020 |              |                               |  |
| Method: EPA TO-11A        | Media: SKC 500-100, UMEx100 Instrument: HPLC12 Passive Sampler |                      |              |                               |  |
|                           | Sampling Parameter: Exposure 347 Minutes                       |                      |              | Analyzed: 11/11/2020 (271190) |  |
| Analyte                   | Result<br>(ug/sample)                                          | Result (mg/m³)       | Result (ppm) | RL (ug/sample)                |  |
| Formaldehyde              | 0.26                                                           | 0.026                | 0.021        | 0.15                          |  |
| Acetaldehyde              | 0.22                                                           | 0.027                | 0.015        | 0.15                          |  |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: <b>72775</b> |                    |                             |                  | Collected      | : 11/04/2020 |
|-------------------------|--------------------|-----------------------------|------------------|----------------|--------------|
| Lab ID: 2031269036      | Sar                | mpling Location: LA F       | Received         | : 11/06/2020   |              |
| Method: NIOSH 1003      |                    | Media: SKC 226-<br>100/50mg | Instrument: GCI4 | 4              |              |
|                         | Sampling           | Parameter: Air Volun        | Analyzed: 11/12  | /2020 (271375) |              |
| Analyte                 | Result (mg/sample) | Result (mg/m³)              | Result (ppm)     | RL (mg/sample) |              |
| Tetrachloroethene       | 0.69               | 16                          | 2.4              | 0.010          |              |

| Sample ID: <b>72780</b> |                       |                             |                     | Collected: 11/ | /04/2020 |  |
|-------------------------|-----------------------|-----------------------------|---------------------|----------------|----------|--|
| Lab ID: 2031269037      | Sai                   | Sampling Location: LA Fire  |                     |                |          |  |
| Method: NIOSH 1003      |                       | Media: SKC 226-<br>100/50mg | Instrument: GCI44   |                |          |  |
|                         | Sampling              | Parameter: Air Volur        | Analyzed: 11/12/202 | 0 (271375)     |          |  |
| Analyte                 | Result<br>(mg/sample) | Result (mg/m³)              | RL (mg/sample)      |                |          |  |
| Tetrachloroethene       | 0.78                  | 17                          | 2.6                 | 0.010          |          |  |

| Sample ID: <b>72773</b> |                       |                            |                   | Collected:     | 11/04/2020 |
|-------------------------|-----------------------|----------------------------|-------------------|----------------|------------|
| Lab ID: 2031269038      | Sar                   | mpling Location: LA F      | Received:         | 11/06/2020     |            |
| Method: NIOSH 1003      |                       | Media: SKC 226<br>100/50mg | Instrument: GCI44 |                |            |
|                         | Sampling              | Parameter: Air Volui       | Analyzed: 11/12/  | 2020 (271375)  |            |
| Analyte                 | Result<br>(mg/sample) | Result (mg/m³)             | Result (ppm)      | RL (mg/sample) |            |
| Tetrachloroethene       | 2.6                   | 67                         | 9.9               | 0.20           |            |

| Sample ID: <b>72779</b> |                       |                            |                    | Collected: 11       | /04/2020    |
|-------------------------|-----------------------|----------------------------|--------------------|---------------------|-------------|
| Lab ID: 2031269039      | Sar                   | mpling Location: LA F      | ire                | Received: 11        | /06/2020    |
| Method: NIOSH 1003      |                       | Media: SKC 226<br>100/50mg | -01, Charcoal Tube | Instrument: GCI44   |             |
|                         | Sampling              | Parameter: Air Volui       | ne 38.59 L         | Analyzed: 11/12/202 | 20 (271375) |
| Analyte                 | Result<br>(mg/sample) | Result (mg/m³)             | Result (ppm)       | RL (mg/sample)      |             |
| Tetrachloroethene       | 2.9                   | 75                         | 11                 | 0.20                |             |

| Sample ID: <b>72781</b> |                       |                             |                    | Collected:              | 11/04/2020     |
|-------------------------|-----------------------|-----------------------------|--------------------|-------------------------|----------------|
| Lab ID: 2031269040      | Sar                   | mpling Location: LA F       | ïre                | Received:               | 11/06/2020     |
| Method: NIOSH 1003      |                       | Media: SKC 226-<br>100/50mg | -01, Charcoal Tube | Instrument: GCI44       | ļ              |
|                         | Sampling              | Parameter: Air Volur        | ne 47.58 L         | <b>Analyzed:</b> 11/12/ | (2020 (271375) |
| Analyte                 | Result<br>(mg/sample) | Result (mg/m³)              | Result (ppm)       | RL (mg/sample)          |                |
| Tetrachloroethene       | 1.3                   | 27                          | 4.1                | 0.20                    |                |



Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

## **Analytical Results**

| Sample ID: <b>72778</b> |                                              |                       |                 | Collected:        | 11/04/2020    |
|-------------------------|----------------------------------------------|-----------------------|-----------------|-------------------|---------------|
| Lab ID: 2031269041      | Sar                                          | mpling Location: LA F | ire             | Received:         | 11/06/2020    |
| Method: NIOSH 1003      | Media: SKC 226-01, Charcoal Tube<br>100/50mg |                       |                 | Instrument: GCI44 |               |
|                         | Sampling                                     | Parameter: Air Volur  | ne Not Provided | Analyzed: 11/12/  | 2020 (271375) |
|                         | Result                                       |                       |                 |                   |               |
| Analyte                 | (mg/sample)                                  | Result (mg/m³)        | Result (ppm)    | RL (mg/sample)    |               |
| Tetrachloroethene       | <0.010                                       | NA                    | NA              | 0.010             | _             |

| Sample ID: <b>72776</b> |                       |                             |                    | Collected:        | 11/04/2020    |
|-------------------------|-----------------------|-----------------------------|--------------------|-------------------|---------------|
| Lab ID: 2031269042      | Sai                   | mpling Location: LA F       | ire                | Received:         | 11/06/2020    |
| Method: NIOSH 1003      |                       | Media: SKC 226-<br>100/50mg | -01, Charcoal Tube | Instrument: GCI44 |               |
|                         | Sampling              | Parameter: Air Volur        | ne 49.3 L          | Analyzed: 11/12/2 | 2020 (271375) |
| Analyte                 | Result<br>(mg/sample) | Result (mg/m³)              | Result (ppm)       | RL (mg/sample)    |               |
| Tetrachloroethene       | 0.58                  | 12                          | 1.7                | 0.010             |               |

| Sample ID: <b>01392</b>  |                                                       |                     |                | Collected: 11/04/2020         |
|--------------------------|-------------------------------------------------------|---------------------|----------------|-------------------------------|
| Lab ID: 2031269043       | Sar                                                   | mpling Location: LA | Fire           | Received: 11/06/2020          |
| Method: IH by GC-MS Scan | Media: SKC 226-98, XAD-7<br>(Phosphoric Acid) 40/80mg |                     |                | Instrument: 5975-D            |
|                          | Sampling                                              | Parameter: Air Volu | ıme 133.73 L   | Analyzed: 11/16/2020 (271472) |
| Anglida                  | Result                                                | Decult (up/m3)      | DI (un/comple) |                               |
| Analyte                  | (ug/sample)                                           | Result (ug/m³)      | RL (ug/sample) |                               |
| N,N-Dimethyl-p-toluidine | < 0.050                                               | < 0.37              | 0.050          |                               |

| Sample ID: <b>01875</b>  |                                                       |                     |                | Collected: 11/04/2020         |
|--------------------------|-------------------------------------------------------|---------------------|----------------|-------------------------------|
| Lab ID: 2031269044       | Sar                                                   | npling Location: LA | Fire           | Received: 11/06/2020          |
| Method: IH by GC-MS Scan | Media: SKC 226-98, XAD-7<br>(Phosphoric Acid) 40/80mg |                     |                | Instrument: 5975-D            |
|                          | Sampling                                              | Parameter: Air Volu | ume 98.41 L    | Analyzed: 11/16/2020 (271472) |
| Analyte                  | Result<br>(ug/sample)                                 | Result (ug/m³)      | RL (ug/sample) |                               |
| N,N-Dimethyl-p-toluidine | <0.050                                                | <0.51               | 0.050          |                               |

| Sample ID: <b>01823</b>  |             |                          |                                    | Collected: 11/04/2020         |
|--------------------------|-------------|--------------------------|------------------------------------|-------------------------------|
| Lab ID: 2031269045       | Sar         | mpling Location: LA      | Fire                               | Received: 11/06/2020          |
| Method: IH by GC-MS Scan |             | Media: SKC 22<br>(Phosph | 6-98, XAD-7<br>noric Acid) 40/80mg | Instrument: 5975-D            |
|                          | Sampling    | Parameter: Air Volu      | ume 107.76 L                       | Analyzed: 11/16/2020 (271472) |
|                          | Result      |                          |                                    |                               |
| Analyte                  | (ug/sample) | Result (ug/m³)           | RL (ug/sample)                     |                               |
| N,N-Dimethyl-p-toluidine | < 0.050     | <0.46                    | 0.050                              |                               |

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

Sample ID: 01872 Collected: 11/04/2020 Lab ID: 2031269046 Sampling Location: LA Fire Received: 11/06/2020 Method: IH by GC-MS Scan Media: SKC 226-98, XAD-7 Instrument: 5975-D (Phosphoric Acid) 40/80mg Sampling Parameter: Air Volume 124.56 L Analyzed: 11/16/2020 (271472) Result **Analyte** (ug/sample) Result (ug/m³) RL (ug/sample) N,N-Dimethyl-p-toluidine < 0.050 < 0.40 0.050

Sample ID: 01871 Collected: 11/04/2020 Lab ID: 2031269047 Sampling Location: LA Fire Received: 11/06/2020 Media: SKC 226-98, XAD-7 Instrument: 5975-D Method: IH by GC-MS Scan (Phosphoric Acid) 40/80mg Sampling Parameter: Air Volume 117.51 L Analyzed: 11/16/2020 (271472) Result **Analyte** (ug/sample) Result (ug/m³) RL (ug/sample) N,N-Dimethyl-p-toluidine < 0.050 < 0.43 0.050

Sample ID: 01878 Collected: 11/04/2020 Lab ID: 2031269048 Sampling Location: LA Fire Received: 11/06/2020 Media: SKC 226-98, XAD-7 Method: IH by GC-MS Scan Instrument: 5975-D (Phosphoric Acid) 40/80mg **Sampling Parameter: Air Volume Not Provided** Analyzed: 11/16/2020 (271472) Result **Analyte** Result (ug/m³) RL (ug/sample) (ug/sample) N,N-Dimethyl-p-toluidine < 0.050 NA 0.050

#### **Report Authorization** (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method           | Analyst                                | Peer Review                               |
|------------------|----------------------------------------|-------------------------------------------|
| EPA TO-11A       | /S/ Daryka Gress<br>11/11/2020 12:08   | /S/ Thomas Bosch<br>11/16/2020 16:52      |
| IH by GC-MS Scan | /S/ David Teynor<br>11/17/2020 10:09   | /S/ Thomas J. Masoian<br>11/17/2020 13:59 |
| NIOSH 1003       | /S/ Katelyn Hinman<br>11/13/2020 10:44 | /S/ Matthew Roberts<br>11/13/2020 14:24   |
| NIOSH 5528       | /S/ David Teynor<br>11/17/2020 15:13   | /S/ Thomas J. Masoian<br>11/17/2020 16:25 |

#### **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive Salt Lake City, Utah 84123 Phone: (801) 266-7700 Email: alslt.lab@ALSGlobal.com Web: www.alsslc.com

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Workorder: **34-2031269** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pilabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                     |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pjlabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pjlabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

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<sup>\*\*</sup> No result could be reported, see sample comments for details.





|     | 1. KEGULAR Status                    | 103/269        |
|-----|--------------------------------------|----------------|
|     | RUSH Status Requested - ADDITIONAL C | HARGE          |
| -   | DAT                                  | Ē              |
| - 1 | CONTACT ALC CALT LAVE DRIOD TO SE    | ENDING CAMPLES |

|                                     |                |                             | DATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|----------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (ALS)                               |                |                             | CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Date 11/05/2020                     | Purchase Orc   | ler No.                     | 4. Quote No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| . Company Name :                    | iuxstrat       | egies                       | ALS Project Manager: THELLAND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Address: 27001                      | La Par         | - Rd Suit                   | e 7/ <sub>6</sub> O 5. Sample Collection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| mission vie                         |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Person to Contact:                  | Hepho          | inie VIVO                   | Industrial Process:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Telephone (14939                    | 2-15           | 34                          | Date of Collection 11/3/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Fax Telephone ( )                   |                |                             | Time Collected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-mail Address:                     | incor          | 2 toxstrat                  | tegies, combate of Shipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Billing Address (if differer        |                | 1                           | Chain of Custody No.:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                     |                |                             | 6. How did you first learn about ALS?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|                                     |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                     |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Client Sample Number                | SES<br>Matrix* | Sample/Area Volume          | ANALYSES REQUESTED - Use method number if known Units** Lab Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                     | 990Ze          | •                           | NOSH 5528 - PAHS 1 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 1120LA-021                          |                | r, management               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1190LA-011                          |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1822 LA - 03.                       |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 114LA-03.                           |                | ,                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1822LA-02 ·                         |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N120 LA-03"                         |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| HM-BLANK-PAHE                       |                | ,                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MYLA-02. W                          |                |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| NIULA-0201                          | E              | ,                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| M90LA-02 .                          |                | range (                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N190 LA- 03 1                       | 2              |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| * 1. μg/sample 2. mg/m <sup>3</sup> | 3. ppm 4       | .% 5. μg/m³ 6. <sub>-</sub> | nger solution; Bulk sample; Blood; Urine; Tissue; Soil; Water; Other  (other) Please indicate one or more units in the column entitled Units**  Date/Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Received by Relinquished by         |                | Jassell                     | Date/TimeDate/Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Danabased by                        |                |                             | Pata/Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| X      | For   | lah    | use   | only | X   |
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|                                                  | 1                                     | . REGULAR S                               | Status                              |                                                  |                 |  |  |
|--------------------------------------------------|---------------------------------------|-------------------------------------------|-------------------------------------|--------------------------------------------------|-----------------|--|--|
|                                                  |                                       | RUSH Status Requested - ADDITIONAL CHARGE |                                     |                                                  |                 |  |  |
|                                                  |                                       | RESULTS F                                 | REQUIRED BYDATE                     |                                                  | -               |  |  |
| (ALS)                                            |                                       | CONTACT                                   | ALS SALT LAKE PRIOR TO SEN          | DING SAMP                                        | LES             |  |  |
| 2. Date 110 S 2010 Purchase Order No.            |                                       | 4.                                        | Quote No.                           | () -110                                          | 110-1           |  |  |
| 3. Company Name: Tox Strategie                   |                                       |                                           | ALS Project Manager:                | Hello                                            | <u>una</u>      |  |  |
| Address: 27001 La Paz Re                         | Suite :                               |                                           | Sample Collection                   | <b>^</b> .                                       |                 |  |  |
| mission viejo CA                                 | 9269                                  |                                           | Sampling Site                       | tire                                             |                 |  |  |
| Person to Contact: Stephane                      | VIVanc                                | Ø                                         | Industrial Process:                 |                                                  |                 |  |  |
| Telephone 144 382 - 1534                         |                                       | Date of Collection 1/2020, 11/3           |                                     |                                                  |                 |  |  |
| Fax Telephone ( )                                |                                       |                                           | Time Collected                      |                                                  |                 |  |  |
| E-mail Address: SVIVan LO                        | )toxstx                               | ategies.us                                | Date of Shipment                    |                                                  |                 |  |  |
| Billing Address (if different from above)        |                                       | Ý                                         | Chain of Custody No.:               |                                                  |                 |  |  |
|                                                  |                                       | 6.                                        | How did you first learn about AL    | S?                                               |                 |  |  |
|                                                  |                                       |                                           |                                     |                                                  |                 |  |  |
|                                                  |                                       |                                           |                                     |                                                  |                 |  |  |
| 7. REQUEST FOR ANALYSES                          |                                       |                                           |                                     |                                                  |                 |  |  |
|                                                  | e/Area Volume                         | ANALYSES REQUES                           | STED - Use method number if known   | Units**                                          | Lab Comments    |  |  |
| Eng-558-PAH-01.99UZE                             |                                       | NOSH 552                                  | 8-PAHS                              | 1                                                | Į (             |  |  |
| Eng-159-PAH-01.1                                 | · · · · · · · · · · · · · · · · · · · |                                           |                                     |                                                  |                 |  |  |
| Erg-583-PAH-02,                                  | حسم ا                                 |                                           |                                     |                                                  |                 |  |  |
| Eng-503-PAH-01 1                                 |                                       |                                           |                                     |                                                  |                 |  |  |
| Gng-583-PAH-02 1                                 |                                       |                                           |                                     |                                                  |                 |  |  |
| Eng-168-PAH-01: -                                |                                       |                                           |                                     |                                                  |                 |  |  |
| H-06 1                                           | •                                     |                                           |                                     |                                                  |                 |  |  |
| H-01,                                            |                                       |                                           |                                     |                                                  |                 |  |  |
| H-03'                                            |                                       | ***************************************   |                                     |                                                  |                 |  |  |
| H-091                                            |                                       |                                           |                                     | <del>                                     </del> |                 |  |  |
| 14-05                                            | · ·                                   |                                           |                                     |                                                  |                 |  |  |
| H-02-1                                           |                                       |                                           |                                     |                                                  |                 |  |  |
|                                                  |                                       |                                           |                                     |                                                  |                 |  |  |
| * Specify: Solid sorbent tube, e.g. Charcoal; Fi | Iter type; Impin                      | ger solution; Bulk sa                     | ample; Blood; Urine; Tissue; Soil;  | Water; Othe                                      | r               |  |  |
| ** 1. μg/sample 2. mg/m³ 3. ppm 4. %             | , ,                                   |                                           | se indicate one or more units in th | e column er                                      | ntitled Units** |  |  |
| Comments + Sample VCV'A                          | as en                                 | <u>g-558-PA</u>                           | H-02.gc                             |                                                  |                 |  |  |
|                                                  |                                       |                                           |                                     |                                                  |                 |  |  |
| Possible Contamination and/or Chemical Hazard    | ds                                    |                                           |                                     |                                                  |                 |  |  |
| 7. Chain of Custody (Optional)                   | \                                     |                                           |                                     | - A A                                            | 1000            |  |  |
| Relinquished by                                  | <u> </u>                              |                                           | Date/Time 11/05/20                  | 20                                               | 6021            |  |  |
| Received by Lund Lund                            | LEP                                   |                                           | Date/Time                           | 9                                                | 10              |  |  |
| Relinquished by                                  |                                       |                                           | Date/Time                           |                                                  |                 |  |  |
| Received by                                      |                                       | [                                         | Date/Time                           |                                                  |                 |  |  |

| $\boxtimes$ | For | lab | use | only | X |
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|-------------|-----|-----|-----|------|---|

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|    |              |      |
| (  | (ALS)        |      |
| ٠, | 1200         |      |

| 1. | REGULAR Status                                 |  |
|----|------------------------------------------------|--|
|    | RUSH Status Requested - ADDITIONAL CHARGE      |  |
|    | DATE                                           |  |
| İ  | CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES |  |

| AP 4                                                     |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       | IS Requested - ADL<br>REQUIRED BY           |                                     | ARGE                                    |                         |
|----------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------|-------------------------------------|-----------------------------------------|-------------------------|
| AL                                                       | 3                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             | DATE                                |                                         | IDI 50                  |
| Date 11/05/2020                                          | <b>3</b> )             | L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       | ALS SALT LAKE PF                            | RIOR TO SEN                         | DING SAM                                | IPLES                   |
| -                                                        |                        | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4                                     | Quote No.                                   |                                     | tello                                   | rhd                     |
|                                                          | exstrate               | 4 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <del>U</del> 0 5                      | ALS Project Mana                            |                                     | 1710                                    |                         |
| Address: 2700                                            | LaPaz                  | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       | . Sample Collectio                          | $A \rightarrow A$                   | fire                                    | 0                       |
| - MKzion                                                 | N 48/0                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       | Sampling Site                               |                                     | , (, ,                                  |                         |
|                                                          | Ponan                  | Le VIVani                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       | Industrial Process                          |                                     | 100                                     | 2.0                     |
| Telephone (1991 _3                                       | 902-15                 | <u>'2-1</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       | Date of Collection                          |                                     | ' (                                     |                         |
| Fax Telephone ( )                                        | 10000                  | (2) +NVC+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | OHOVE I                               | Time Collected _                            |                                     |                                         |                         |
| E-mail Address:                                          | 0                      | (20 (OX 3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | racisfry.                             |                                             |                                     |                                         |                         |
| Billing Address (if differe                              | nt from above)         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |
|                                                          |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6                                     | . How did you first le                      | earn about AL                       | .S?                                     |                         |
|                                                          |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |
| P-D-S-                                                   |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |
| . REQUEST FOR ANALY                                      | SES                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     | , , , , , , , , , , , , , , , , , , , , |                         |
| Client Sample Number                                     | Matrix*                | Sample/Area Volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ANALYSES REQUE                        | STED - Use method nu                        | mber if known                       | Units**                                 | Lab Comments            |
| A49996"                                                  | gavze                  | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NIOSH '                               | SS 28 - P\$                                 | 7Hs                                 | 1                                       | <b>\(</b> (             |
| PAH-blank.                                               | 1                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     | 1                                       |                         |
| ASO421 Eng-21-4                                          | 1                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |
| 15014 Q-24-5.                                            |                        | A STATE OF THE PARTY OF THE PAR |                                       |                                             |                                     |                                         |                         |
| ECTC-T-8:                                                |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |
| ECTC - T-38 4                                            |                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |                                             |                                     |                                         |                         |
| NC20-04 x                                                | 4                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         | ٠,                      |
|                                                          | . A                    | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       | 2 crestolde                                 | hyde .                              |                                         | 13                      |
| <u> </u>                                                 | padge                  | 397 mus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | EPA-10-1                              | A acetalde                                  | naldehyd                            | 13                                      |                         |
| A295583 *                                                | 600-106                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     | 1-4-1                                   |                         |
| A2955611                                                 |                        | 347 Mh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |                                             |                                     | <del> S  </del>                         |                         |
|                                                          |                        | :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       | 1,0,000                                     |                                     |                                         |                         |
|                                                          |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |
| Specify: Solid sorbent to  1. μg/sample 2. mg/m Comments | <sup>3</sup> 3. ppm 4. | oal; Filter type; Impir<br>% 5. μg/m <sup>3</sup> 6. <sub>-</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | nger solution; Bulk s<br>(other) Plea | ample; Blood; Urine<br>se indicate one or m | ; Tissue; Soil;<br>nore units in th | Water; Oth                              | ner<br>entitled Units** |
| Possible Contamination an                                | d/or Chemical I        | Hazards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                       |                                             |                                     |                                         |                         |
| 7. Chain of Custody (Opt                                 | ional)                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       | <u> </u>                                    | 10010                               |                                         | l a A -                 |
| Relinquished by                                          |                        | <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       | Date/Time                                   | 105/ 2                              | 020                                     | 1600                    |
| Received by                                              | mony                   | 0-5×2(2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       | Date/Time                                   | 706-90                              | <b>&gt;</b>                             | 4:10                    |
| Relinquished by                                          | $\cup$                 | · · · · · · · · · · · · · · · · · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       | Date/Time                                   |                                     | 44484                                   |                         |
| Received by                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Date/Time                             |                                             |                                     |                                         |                         |
| LIGUUIVOU DY                                             |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                             |                                     |                                         |                         |

| X | For | lab | use | only | X |
|---|-----|-----|-----|------|---|
|---|-----|-----|-----|------|---|

| <b>A</b> |
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|          |
|          |
|          |
| (ALS)    |

| 1 | REGULAR Status                                                |
|---|---------------------------------------------------------------|
|   | RUSH Status Requested - ADDITIONAL CHARGE RESULTS REQUIRED BY |
| ļ | DATE                                                          |
| ١ | CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES                |

|                                      |                  |                          |                  | <b>4.</b> Quote No      |                               |                                         |              |               |  |
|--------------------------------------|------------------|--------------------------|------------------|-------------------------|-------------------------------|-----------------------------------------|--------------|---------------|--|
| . Company Name: TOX STYTHEGIES       |                  |                          |                  | ALS Project N           | ALS Project Manager: THelland |                                         |              |               |  |
| Address: 27001 La Paz Rd Suite 260   |                  |                          |                  | 5. Sample Colle         | 5. Sample Collection          |                                         |              |               |  |
| MISSION VIENO UA 92691               |                  |                          |                  | Sampling Site           |                               | fire                                    | 2            |               |  |
| Person to Contact: Stephante VIVanca |                  |                          |                  | Industrial Pro          | cess:                         |                                         |              |               |  |
| Telephone (949                       | 38 <u>2 - 15</u> | 34                       |                  | Date of Collec          | cess:                         | 1/20                                    | 120          |               |  |
| Fax Telephone ( )                    |                  |                          |                  | Time Collecte           | ed                            |                                         |              |               |  |
| E-mail Address: SVI                  | vanco            | @ toxstra                | tegies.a         | Date of Shipm           | nent                          |                                         |              |               |  |
| Billing Address (if differe          | nt from above)   |                          |                  | Chain of Cust           | tody No.:                     |                                         |              |               |  |
|                                      |                  |                          | 20.412.73.44     | <b>6.</b> How did you f | first learn about AL          | S?                                      |              |               |  |
|                                      |                  |                          |                  |                         |                               |                                         |              |               |  |
|                                      |                  |                          |                  |                         |                               |                                         |              |               |  |
| 7. REQUEST FOR ANALY                 | SES              |                          |                  |                         |                               |                                         |              |               |  |
| Client Sample Number                 | Matrix*          | Sample/Area Volume       | ANALYSES R       | EQUESTED - Use metho    | od number if known            | Units**                                 | Lab Comments |               |  |
| 72775'                               | charbal          | 42.20 L                  | NLOSH            | 1003 - Tetra            | achloroethy                   | ene E                                   | 5 19         |               |  |
| 72780,                               | 24-01            | 45.30 L                  | Ì                |                         |                               | \$                                      | <u> </u>     | _             |  |
| 72773"                               |                  | 38,44 L                  |                  |                         |                               | L Ş                                     |              | _             |  |
| 727791                               |                  | 38.59L                   | 1                |                         |                               | 9                                       |              | _             |  |
| 727814                               |                  | 47.58 L                  |                  |                         |                               |                                         |              | _             |  |
| 72778                                |                  | 110.201                  |                  |                         |                               | 5                                       |              | _             |  |
| 727766                               | 1/AD 7           | 13373 L                  | 1 LIDAUX         | 005- N'N-9N             | methyl-para-                  | <u>5</u>                                | 18           | $\dashv$      |  |
| 010101                               | XAD-7            | 1 - 2 - 2 - 1            | 1103(10          |                         | towithe                       | 5                                       | 1            | $\dashv$      |  |
| 0/8/23/                              | 226-98           | 107.76 L                 |                  |                         |                               | \$                                      |              |               |  |
| 01872                                |                  | 124.56L                  |                  |                         |                               | 5                                       |              |               |  |
| 019711                               |                  | 117.516                  |                  | *                       |                               | S                                       |              | ************* |  |
| 01878                                |                  |                          |                  |                         |                               | 1                                       | ب            |               |  |
|                                      |                  |                          |                  |                         |                               |                                         |              |               |  |
| * Specify: Solid sorbent to          | ube, e.g. Char   | coal; Filter type; Impir | nger solution; E | Bulk sample; Blood; U   | Jrine; Tissue; Soil;          | Water; Oth                              | er           |               |  |
| ** 1. μg/sample 2. mg/m              | ° 3. ppm 4.      | .% 5. μg/m° 6. ຼ         | (otner)          | Please indicate one     | or more units in th           | e column e                              | nuted Onits  |               |  |
| Comments                             |                  | Hoween                   |                  |                         |                               | *************************************** |              |               |  |
|                                      |                  |                          |                  |                         |                               |                                         |              |               |  |
| Possible Contamination an            |                  | Hazards                  |                  |                         |                               |                                         |              |               |  |
| 7. Chain of Custody (Opt             | Jonai)           | <u> </u>                 |                  |                         | 11/05/5                       | 1100 1                                  | 0001         |               |  |
| Relinquished by                      |                  | A II MA                  |                  |                         | 11 1 25 15 15                 |                                         |              |               |  |
| Received by ( )                      | in/any           | pssal                    |                  | Date/Time               | 11-010-8C                     | , 9                                     | 10           | _             |  |
| Relinquished by                      |                  | <i></i>                  |                  | Date/Time               | Date/Time                     |                                         |              |               |  |
| Received by                          |                  |                          |                  | Date/Time               |                               |                                         |              |               |  |
|                                      |                  | 22000                    |                  |                         |                               |                                         |              | _             |  |



Report Date: November 13, 2020

Stephanie Vivanco ToxStrategies 27001 La Paz Road, Suite 260 Mission Viejo, CA 92691 Phone: 949-382-1534

E-mail: svivanco@toxstrategies.com

Workorder: **34-2031281** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

| Sample ID: <b>11409</b><br>Lab ID: 2031281001 | Sar                   | mpling Location: LA                    | Fire                                                | Collected: 11/04/2020<br>Received: 11/06/2020 |
|-----------------------------------------------|-----------------------|----------------------------------------|-----------------------------------------------------|-----------------------------------------------|
| Method: NIOSH 5040                            | Sampling              | Media: Quartz l<br>Parameter: Air Volu | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |                                               |
| Analyte                                       | Result<br>(ug/sample) | Result (ug/m³)                         | RL (ug/sample)                                      |                                               |
| Organic Carbon                                | 14                    | NA                                     | 5.2                                                 |                                               |
| Elemental Carbon                              | <1.8                  | NA                                     | 1.8                                                 |                                               |
| Total Carbon                                  | 14                    |                                        |                                                     |                                               |

| Sample ID: 11403   | 0                                                               |                     | F'             | Collected: 11/04/2020                               |
|--------------------|-----------------------------------------------------------------|---------------------|----------------|-----------------------------------------------------|
| Lab ID: 2031281002 | Sar                                                             | mpling Location: LA | Fire           | Received: 11/06/2020                                |
| Method: NIOSH 5040 | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 832 L |                     |                | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte            | Result<br>(ug/sample)                                           | Result (ug/m³)      | RL (ug/sample) |                                                     |
| Organic Carbon     | 72                                                              | 86                  | 5.2            |                                                     |
| Elemental Carbon   | <1.8                                                            | <2.2                | 1.8            |                                                     |
| Total Carbon       | 72                                                              | 86                  |                |                                                     |

| Sample ID: <b>11401</b> |                                                                   |                     |                      | Collected: 11/04/2020                               |
|-------------------------|-------------------------------------------------------------------|---------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031281003      | Sai                                                               | mpling Location: LA | Received: 11/06/2020 |                                                     |
| Method: NIOSH 5040      | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 754.3 L |                     |                      | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte                 | Result<br>(ug/sample)                                             | Result (ug/m³)      | RL (ug/sample)       |                                                     |
| Organic Carbon          | 120                                                               | 160                 | 5.2                  |                                                     |
| Elemental Carbon        | <1.8                                                              | <2.4                | 1.8                  |                                                     |
| Total Carbon            | 120                                                               | 160                 | _                    | _                                                   |

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company



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Workorder: **34-2031281** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

### **Analytical Results**

| Sample ID: <b>11405</b> |                                                                 |                     |                      | Collected: 11/04/2020                               |
|-------------------------|-----------------------------------------------------------------|---------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031281004      | Sar                                                             | mpling Location: LA | Received: 11/06/2020 |                                                     |
| Method: NIOSH 5040      | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 786 L |                     |                      | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte                 | Result (ug/sample)                                              | Result (ug/m³)      | RL (ug/sample)       |                                                     |
| Organic Carbon          | 440                                                             | 550                 | 5.2                  |                                                     |
| Elemental Carbon        | 140                                                             | 180                 | 1.8                  |                                                     |
| Total Carbon            | 580                                                             | 730                 |                      |                                                     |

| Sample ID: <b>11406</b> Lab ID: 2031281005 | Sai                                                             | mpling Location: LA | Fire           | Collected: 11/04/2020<br>Received: 11/06/2020       |
|--------------------------------------------|-----------------------------------------------------------------|---------------------|----------------|-----------------------------------------------------|
| Method: NIOSH 5040                         | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 718 L |                     |                | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte                                    | Result (ug/sample)                                              | Result (ug/m³)      | RL (ug/sample) |                                                     |
| Organic Carbon                             | 75                                                              | 100                 | 5.2            |                                                     |
| Elemental Carbon                           | <1.8                                                            | <2.5                | 1.8            |                                                     |
| Total Carbon                               | 75                                                              | 100                 | _              | _                                                   |

| Sample ID: <b>11407</b> |                                                                 |                     |                      | Collected: 11/04/2020                               |
|-------------------------|-----------------------------------------------------------------|---------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031281006      | Sar                                                             | npling Location: LA | Received: 11/06/2020 |                                                     |
| Method: NIOSH 5040      | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 858 L |                     |                      | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte                 | Result (ug/sample)                                              | Result (ug/m³)      | RL (ug/sample)       |                                                     |
| Organic Carbon          | 48                                                              | 56                  | 5.2                  |                                                     |
| Elemental Carbon        | <1.8                                                            | <2.1                | 1.8                  |                                                     |
| Total Carbon            | 48                                                              | 56                  |                      |                                                     |

| Sample ID: <b>11404</b> |                       |                                     |                                                     | Collected: 11/04/2020 |
|-------------------------|-----------------------|-------------------------------------|-----------------------------------------------------|-----------------------|
| Lab ID: 2031281007      | Sai                   | mpling Location: LA                 | Fire                                                | Received: 11/06/2020  |
| Method: NIOSH 5040      | Sampling              | Media: Quartz g Parameter: Air Volu | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |                       |
| Analyte                 | Result<br>(ug/sample) | Result (ug/m³)                      | RL (ug/sample)                                      |                       |
| Organic Carbon          | 55                    | 68                                  | 5.2                                                 |                       |
| Elemental Carbon        | <1.8                  | <2.2                                | 1.8                                                 |                       |
| Total Carbon            | 55                    | 68                                  |                                                     |                       |



Workorder: **34-2031281** 

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### **Analytical Results**

| Sample ID: <b>11402</b> |                                                                 |                     |                      | Collected: 11/04/2020                               |
|-------------------------|-----------------------------------------------------------------|---------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031281008      | Sar                                                             | mpling Location: LA | Received: 11/06/2020 |                                                     |
| Method: NIOSH 5040      | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 816 L |                     |                      | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte                 | Result<br>(ug/sample)                                           | Result (ug/m³)      | RL (ug/sample)       |                                                     |
| Organic Carbon          | 85                                                              | 100                 | 5.2                  |                                                     |
| Elemental Carbon        | <1.8                                                            | <2.2                | 1.8                  |                                                     |
| Total Carbon            | 85                                                              | 100                 |                      |                                                     |

| Sample ID: <b>11408</b> |                                                                 |                     |                      | Collected: 11/04/2020                               |
|-------------------------|-----------------------------------------------------------------|---------------------|----------------------|-----------------------------------------------------|
| Lab ID: 2031281009      | Sar                                                             | mpling Location: LA | Received: 11/06/2020 |                                                     |
| Method: NIOSH 5040      | Media: Quartz Fiber Filter Sampling Parameter: Air Volume 852 L |                     |                      | Instrument: ECOC01<br>Analyzed: 11/11/2020 (271284) |
| Analyte                 | Result (ug/sample)                                              | Result (ug/m³)      | RL (ug/sample)       |                                                     |
| Organic Carbon          | 42                                                              | 49                  | 5.2                  |                                                     |
| Elemental Carbon        | <1.8                                                            | <2.1                | 1.8                  |                                                     |
| Total Carbon            | 42                                                              | 49                  |                      |                                                     |

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Method     | Analyst             | Peer Review      |
|------------|---------------------|------------------|
| NIOSH 5040 | /S/ Matthew Roberts | /S/ Max Allred   |
|            | 11/12/2020 08:32    | 11/13/2020 13:22 |

#### **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive

Salt Lake City, Utah 84123

Phone: (801) 266-7700

Email: alslt.lab@ALSGlobal.com

Web: www.alsslc.com

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Workorder: 34-2031281

Client Project ID: LA Fire Purchase Order: NA

Project Manager: Jessica Helland

#### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

The following was provided by the client: Sample ID, Collection Date, Sampling Location, Media Type, Sampling Parameter.

Collection Date, Media Type, and Sampling Parameter can potentially affect the validity of the results.

Samples have not been blank corrected unless otherwise noted.

This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector      | Accreditation Body (Standard)    | Certificate<br>Number | Website                                                                                    |
|---------------------|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------|
| Environmental       | PJLA (DoD ELAP)                  | L20-57                | http://www.pjlabs.com                                                                      |
|                     | PJLA (ISO 17025)                 | L20-58                | http://www.pjlabs.com                                                                      |
|                     | Utah (TNI)                       | UT00953               | http://lams.nelac-institute.org/search                                                     |
| Industrial Hygiene  | AIHA (ISO 17025 &<br>AIHA IHLAP) | 101574                | http://www.aihaaccreditedlabs.org                                                          |
|                     | DOECAP-AP                        | L20-59                | http://www.pilabs.com                                                                      |
|                     | Washington                       | C596                  | https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation |
| Dietary Supplements | PJLA (ISO 17025)                 | L17-507-R1            | http://www.pjlabs.com                                                                      |

#### **Definitions**

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

- < Means this testing result is less than the numerical value.
- () This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

<sup>\*\*</sup> No result could be reported, see sample comments for details.



# ANALYTICAL REQUEST FORM



|     | ANALITICAL NEGOLOTTONII                                       |
|-----|---------------------------------------------------------------|
| _   | 1. REGULAR Status M3 28                                       |
|     | RUSH Status Requested - ADDITIONAL CHARGE RESULTS REQUIRED BY |
| ١   | DATE                                                          |
| - 1 | CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES                |

| <b>4</b> 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RESULTS REQUIRED BY                                                                                                                           |
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| AL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DATE CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            | der No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4. Quote No.                                                                                                                                  |
| . Company Name : To                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ALS Project Manager: THELAND                                                                                                                  |
| Address: 27001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | La Paz     | Rd Suite 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                               |
| MISSIM VIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | jo ca      | 92691                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sampling Site Fire                                                                                                                            |
| Person to Contact: 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ephani     | e VIVanco                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Industrial Process:                                                                                                                           |
| Telephone (144) 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2-15       | 34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Date of Collection 11/04/2020                                                                                                                 |
| Fax Telephone ( )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Time Collected                                                                                                                                |
| E-mail Address:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ivanu      | o po toxs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | trategies, whate of Shipment                                                                                                                  |
| Billing Address (if differe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            | Control of the Contro | Chain of Custody No.:                                                                                                                         |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                               |
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| . REQUEST FOR ANALY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SES        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                               |
| Client Sample Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Matrix*    | Sample/Area Volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ANALYSES REQUESTED - Use method number if known Units** Lab Comments                                                                          |
| 114-09:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | OFF        | - Salara Salara                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NIOSH SOYO-diesel particulore 1                                                                                                               |
| 11403.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ĺ          | 832 L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5                                                                                                                                             |
| 11401.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | 754.3 L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                               |
| 11405.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | 786 L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                               |
| 114060                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | 7181                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                               |
| 11407.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            | 858 L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                               |
| 11404.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <u> </u>   | 806L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                               |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                               |
| ossible Contamination and<br>. Chain of Custody (Op <del>ti</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            | Hazards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                               |
| elinquished by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Report     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Date/Time \\\/OS/2020 \( \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \                                                                                  |
| eceived by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | with       | XIII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Date/Time (1-710-71) 9:10                                                                                                                     |
| Relinquished by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | - 0 4 NO 0 | ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Date/Time                                                                                                                                     |
| Received by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Date/Time                                                                                                                                     |



1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6 Phone: 905-331-3111, FAX: 905-331-4567

# **Certificate of Analysis**

ALS Project Contact: Lynne Wrona

ALS Project ID: TOXS100

**ALS WO#**: L2526958

Date of Report 22-Dec-20

Date of Sample Receipt 6-Nov-20

Client Name: ToxStrategies

Client Address: 27001 La Paz Road, Suite 260

Mission Viejo, CA 92691

United States

Client Contact: Stephanie Vivanco

Client Project ID: LA FIRE

COMMENTS: PCDD/F by EPA 1613B via Isotope Dilution

Some Extraction (internal) Standards gave recovery below the method acceptance criteria. Native results calculated by Isotope Dilution are inherently recovery corrected so no impact to overall data quality is expected.

Certified by:

Bradley Reimer

GC/MS Laboratory Senior Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.

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|                                   | А          | LS Life So       | ciences      |            |            |                |
|-----------------------------------|------------|------------------|--------------|------------|------------|----------------|
|                                   | Sam        | ple Analysis Sur | nmary Report |            |            |                |
| Sample Name                       | BA-1       | BA-2             | BA-3-BLANK   | 356-4      | 356-5      | ENG-558-DFP-02 |
| ALS Sample ID                     | L2526958-1 | L2526958-2       | L2526958-3   | L2526958-4 | L2526958-5 | L2526958-6     |
| Sample Size                       | 1          | 1                | 1            | 1          | 1          | 1              |
| Sample size units                 | Swab       | Swab             | Swab         | Swab       | Swab       | Swab           |
| Percent Moisture                  | n/a        | n/a              | n/a          | n/a        | n/a        | n/a            |
| Sample Matrix                     | Swab       | Swab             | Swab         | Swab       | Swab       | Swab           |
| Sampling Date                     | 3-Nov-20   | 3-Nov-20         | 3-Nov-20     | 3-Nov-20   | 3-Nov-20   | 4-Nov-20       |
| Extraction Date                   | 25-Nov-20  | 25-Nov-20        | 25-Nov-20    | 25-Nov-20  | 25-Nov-20  | 25-Nov-20      |
| Target Analytes                   | pg         | pg               | pg           | pg         | pg         | pg             |
| 2,3,7,8-TCDD                      | <1.2       | <1.4             | <1.0         | <0.92      | <1.1       | <1.1           |
| 1,2,3,7,8-PeCDD                   | <0.88      | <2.1             | <0.77        | < 0.75     | <0.97      | <1.0           |
| 1,2,3,4,7,8-HxCDD                 | <1.3       | <2.8             | < 0.74       | <0.68      | <1.2       | <1.1           |
| 1,2,3,6,7,8-HxCDD                 | <1.1       | <2.6             | < 0.65       | <0.59      | <1.1       | <1.0           |
| 1,2,3,7,8,9-HxCDD                 | <1.1       | <3.2             | < 0.66       | <0.60      | <1.1       | <1.0           |
| 1,2,3,4,6,7,8-HpCDD               | 7.97       | <22              | <1.5         | <1.8       | <3.3       | 12.0           |
| OCDD                              | 35.6       | <56              | <2.2         | <3.6       | 6.53       | 68.0           |
| 2,3,7,8-TCDF                      | <1.2       | <1.5             | <1.0         | <0.89      | <1.1       | <0.93          |
| 1,2,3,7,8-PeCDF                   | <0.97      | <1.3             | < 0.64       | < 0.69     | < 0.63     | <0.87          |
| 2,3,4,7,8-PeCDF                   | < 0.73     | < 0.97           | < 0.47       | <0.55      | < 0.49     | < 0.70         |
| 1,2,3,4,7,8-HxCDF                 | <1.0       | <2.1             | < 0.45       | <0.53      | < 0.71     | < 0.71         |
| 1,2,3,6,7,8-HxCDF                 | <0.86      | <1.9             | < 0.43       | < 0.49     | < 0.66     | <0.81          |
| 2,3,4,6,7,8-HxCDF                 | < 0.87     | <1.7             | < 0.45       | <0.54      | < 0.72     | <1.4           |
| 1,2,3,7,8,9-HxCDF                 | <1.3       | <2.3             | < 0.67       | 1.02       | <1.2       | <1.1           |
| 1,2,3,4,6,7,8-HpCDF               | <3.1       | <4.3             | <1.3         | <1.1       | <1.2       | <4.7           |
| 1,2,3,4,7,8,9-HpCDF               | <2.9       | <9.3             | <2.0         | <1.8       | <1.8       | <2.7           |
| OCDF                              | <5.2       | 12.0             | <2.3         | <3.3       | <4.6       | 11.0           |
| Extraction Standards              | % Rec      | % Rec            | % Rec        | % Rec      | % Rec      | % Rec          |
| 13C12-2,3,7,8-TCDD                | 60         | 47               | 50           | 67         | 55         | 66             |
| 13C12-1,2,3,7,8-PeCDD             | 54         | 30               | 52           | 60         | 52         | 55             |
| 13C12-1,2,3,4,7,8-HxCDD           | 49         | 28               | 57           | 75         | 64         | 72             |
| 13C12-1,2,3,6,7,8-HxCDD           | 56         | 30               | 61           | 77         | 67         | 74             |
| 13C12-1,2,3,4,6,7,8-HpCDD         | 50         | 29               | 59           | 67         | 57         | 59             |
| 13C12-OCDD                        | 44         | 30               | 53           | 54         | 44         | 41             |
| 13C12-2,3,7,8-TCDF                | 58         | 50               | 49           | 65         | 53         | 64             |
| 13C12-1,2,3,7,8-PeCDF             | 57         | 36               | 52           | 62         | 52         | 59             |
| 13C12-2,3,4,7,8-PeCDF             | 58         | 36               | 53           | 61         | 51         | 57             |
| 13C12-1,2,3,4,7,8-HxCDF           | 50         | 28               | 51           | 71         | 60         | 70             |
| 13C12-1,2,3,6,7,8-HxCDF           | 64         | 35               | 64           | 88         | 75         | 86             |
| 13C12-2,3,4,6,7,8-HxCDF           | 67         | 42               | 62           | 81         | 70         | 77             |
| 13C12-1,2,3,7,8,9-HxCDF           | 59         | 38               | 57           | 72         | 59         | 69             |
| 13C12-1,2,3,4,6,7,8-HpCDF         | 57         | 29               | 63           | 74         | 63         | 69             |
| 13C12-1,2,3,4,7,8,9-HpCDF         | 45         | 19               | 62           | 72         | 59         | 63             |
| Cleanup Standard                  |            |                  |              |            |            |                |
| 37Cl4-2,3,7,8-TCDD (Cleanup)      | 47         | 35               | 37           | 49         | 39         | 53             |
| Homologue Group Totals            | pg         | pg               | pg           | pg         | pg         | pg             |
| Total-TCDD                        | <1.2       | <1.4             | <1.0         | < 0.92     | <1.1       | <1.1           |
| Total-PeCDD                       | <0.88      | <2.1             | <0.77        | < 0.75     | < 0.97     | <1.0           |
| Total-HxCDD                       | <1.3       | 8.68             | <0.74        | < 0.68     | <1.2       | <1.1           |
| Total-HpCDD                       | 21.7       | 34.1             | <1.5         | <1.8       | <3.3       | 25.2           |
| Total-TCDF                        | <1.2       | <1.5             | <1.0         | < 0.89     | <1.1       | <0.93          |
| Total-PeCDF                       | <0.97      | <1.3             | < 0.64       | < 0.69     | < 0.63     | <0.87          |
| Total-HxCDF                       | 2.35       | 2.49             | <0.67        | 1.02       | <1.2       | 4.32           |
| Total-HpCDF                       | <2.9       | <9.3             | <2.0         | <1.8       | <1.8       | <2.7           |
| Toxic Equivalency - (WHO 2005)    |            |                  |              |            |            |                |
| Lower Bound PCDD/F TEQ (WHO 2005) | 0.0904     | 0.00360          | 0.00         | 0.102      | 0.00196    | 0.144          |
| Mid Point PCDD/F TEQ (WHO 2005)   | 1.74       | 3.29             | 1.24         | 1.27       | 1.54       | 1.89           |
| Upper Bound PCDD/F TEQ (WHO 2005) | 3.35       | 6.02             | 2.48         | 2.44       | 3.08       | 3.36           |

|                                   |                | ALS Life So       |              |               |                |                |
|-----------------------------------|----------------|-------------------|--------------|---------------|----------------|----------------|
|                                   | Sai            | mple Analysis Sun | nmary Report |               |                |                |
| Sample Name                       | ENG-583-DFP-02 | ENG-168-DFP-01    | DFP-BLANK    | ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-01 |
| ALS Sample ID                     | L2526958-7     | L2526958-8        | L2526958-9   | L2526958-10   | L2526958-11    | L2526958-12    |
| Sample Size                       | 1              | 1                 | 1            | 1             | 1              | 1              |
| Sample size units                 | Swab           | Swab              | Swab         | Swab          | Swab           | Swab           |
| Percent Moisture                  | n/a            | n/a               | n/a          | n/a           | n/a            | n/a            |
| Sample Matrix                     | Swab           | Swab              | Swab         | Swab          | Swab           | Swab           |
| Sampling Date                     | 4-Nov-20       | 4-Nov-20          | 4-Nov-20     | 4-Nov-20      | 4-Nov-20       | 4-Nov-20       |
| Extraction Date                   | 25-Nov-20      | 25-Nov-20         | 25-Nov-20    | 25-Nov-20     | 25-Nov-20      | 25-Nov-20      |
| Target Analytes                   | pg             | pg                | pg           | pg            | pg             | pg             |
| 2,3,7,8-TCDD                      | <1.1           | <1.4              | <1.2         | <1.4          | <1.6           | <1.1           |
| 1,2,3,7,8-PeCDD                   | <0.87          | <1.2              | <0.82        | <1.3          | <1.6           | <1.2           |
| 1,2,3,4,7,8-HxCDD                 | <1.5           | <1.5              | <1.0         | <1.4          | <1.7           | <1.4           |
| 1,2,3,6,7,8-HxCDD                 | <1.3           | <1.3              | < 0.92       | <1.2          | <1.6           | <1.5           |
| 1,2,3,7,8,9-HxCDD                 | <1.3           | <1.3              | < 0.92       | <1.2          | <1.8           | <1.6           |
| 1,2,3,4,6,7,8-HpCDD               | <6.9           | <4.8              | <2.2         | <9.3          | <24            | 18.1           |
| OCDD                              | <30            | 57.4              | <4.1         | 93.8          | 184            | 135            |
| 2,3,7,8-TCDF                      | <0.95          | <1.1              | < 0.90       | <1.1          | <1.5           | <0.85          |
| 1,2,3,7,8-PeCDF                   | < 0.73         | <1.3              | < 0.79       | < 0.96        | <1.4           | <1.1           |
| 2,3,4,7,8-PeCDF                   | < 0.60         | < 0.97            | < 0.59       | < 0.76        | <1.1           | < 0.87         |
| 1,2,3,4,7,8-HxCDF                 | < 0.73         | < 0.79            | < 0.62       | <1.0          | <1.7           | < 0.96         |
| 1,2,3,6,7,8-HxCDF                 | < 0.74         | < 0.90            | < 0.60       | 1.48          | 2.00           | <0.82          |
| 2,3,4,6,7,8-HxCDF                 | < 0.78         | <0.83             | < 0.64       | <1.0          | <1.8           | <0.88          |
| 1,2,3,7,8,9-HxCDF                 | <1.3           | <1.5              | < 0.96       | <1.6          | <2.8           | <1.3           |
| 1,2,3,4,6,7,8-HpCDF               | 3.56           | <3.7              | <1.5         | 5.17          | 15.8           | 11.0           |
| 1,2,3,4,7,8,9-HpCDF               | <2.1           | <6.2              | <2.3         | <5.2          | <5.4           | <6.5           |
| OCDF                              | <5.3           | 10.5              | <5.0         | 17.1          | <21            | 14.1           |
| Extraction Standards              | % Rec          | % Rec             | % Rec        | % Rec         | % Rec          | % Rec          |
| 13C12-2,3,7,8-TCDD                | 53             | 51                | 54           | 54            | 47             | 57             |
| 13C12-1,2,3,7,8-PeCDD             | 51             | 48                | 50           | 44            | 39             | 43             |
| 13C12-1,2,3,4,7,8-HxCDD           | 59             | 69                | 64           | 60            | 56             | 57             |
| 13C12-1,2,3,6,7,8-HxCDD           | 72             | 70                | 64           | 67            | 59             | 56             |
| 13C12-1,2,3,4,6,7,8-HpCDD         | 56             | 54                | 56           | 47            | 52             | 46             |
| 13C12-OCDD                        | 48             | 36                | 42           | 28            | 42             | 34             |
| 13C12-2,3,7,8-TCDF                | 59             | 55                | 54           | 52            | 50             | 55             |
| 13C12-1,2,3,7,8-PeCDF             | 53             | 50                | 50           | 45            | 42             | 46             |
| 13C12-2,3,4,7,8-PeCDF             | 53             | 50                | 52           | 45            | 40             | 44             |
| 13C12-1,2,3,4,7,8-HxCDF           | 64             | 69                | 59           | 67            | 61             | 58             |
| 13C12-1,2,3,6,7,8-HxCDF           | 73             | 84                | 70           | 74            | 65             | 64             |
| 13C12-2,3,4,6,7,8-HxCDF           | 70             | 77                | 65           | 72            | 63             | 64             |
| 13C12-1,2,3,7,8,9-HxCDF           | 57             | 60                | 60           | 62            | 54             | 57             |
| 13C12-1,2,3,4,6,7,8-HpCDF         | 65             | 63                | 62           | 54            | 53             | 49             |
| 13C12-1,2,3,4,7,8,9-HpCDF         | 60             | 53                | 57           | 47            | 52             | 41             |
| Cleanup Standard                  |                |                   |              |               |                |                |
| 37Cl4-2,3,7,8-TCDD (Cleanup)      | 40             | 38                | 43           | 45            | 39             | 47             |
| Homologue Group Totals            | pg             | pg                | pg           | pg            | pg             | pg             |
| Total-TCDD                        | <1.1           | <1.4              | <1.2         | <1.4          | 28.0           | <1.1           |
| Total-PeCDD                       | <0.87          | <1.2              | <0.82        | <1.3          | 4.90           | <1.2           |
| Total-HxCDD                       | <1.5           | <1.5              | <1.0         | 2.94          | 3.82           | <1.4           |
| Total-HpCDD                       | <2.5           | 13.0              | <2.2         | <5.1          | 35.5           | 18.1           |
| Total-TCDF                        | <0.95          | <1.1              | <0.90        | <1.1          | <1.5           | <0.85          |
| Total-PeCDF                       | <0.73          | <1.3              | <0.79        | <0.96         | <1.4           | <1.1           |
| Total-HxCDF                       | <1.3           | <1.5              | <0.96        | 3.13          | 6.15           | 4.28           |
| Total-HpCDF                       | 3.56           | <6.2              | <2.3         | 8.17          | 15.8           | 11.0           |
| Toxic Equivalency - (WHO 2005)    |                |                   |              |               |                |                |
| Lower Bound PCDD/F TEQ (WHO 2005) | 0.0356         | 0.0204            | 0.00         | 0.233         | 0.413          | 0.336          |
| Mid Point PCDD/F TEQ (WHO 2005)   | 1.64           | 2.11              | 1.47         | 2.26          | 3.21           | 2.29           |
| Upper Bound PCDD/F TEQ (WHO 2005) | 3.17           | 4.02              | 2.94         | 4.18          | 5.58           | 3.93           |

|                                   | F            | ALS Life So       | ciences                     |  |
|-----------------------------------|--------------|-------------------|-----------------------------|--|
|                                   | Qu           | ality Control Sun | nmary Report                |  |
| Sample Name                       | Method Blank | Method Blank La   | aboratory Control<br>Sample |  |
| ALS Sample ID                     | WG3440853-1  | WG3440853-4       | WG3440853-2                 |  |
| Sample Size                       | 1            | 1                 | 1                           |  |
| Sample size units                 | Swab         | Reagent           | n/a                         |  |
| Percent Moisture                  | n/a          | n/a               | n/a                         |  |
| Sample Matrix                     | QC           | QC                | QC                          |  |
| Sampling Date                     | n/a          | n/a               | n/a                         |  |
| Extraction Date                   | 25-Nov-20    | 25-Nov-20         | 25-Nov-20                   |  |
| Target Analytes                   | pg           | pg                | % Rec                       |  |
| 2,3,7,8-TCDD                      | <1.5         | <1.2              | 83                          |  |
| 1,2,3,7,8-PeCDD                   | <1.1         | <0.94             | 110                         |  |
| 1,2,3,4,7,8-HxCDD                 | <1.3         | <0.91             | 104                         |  |
| 1,2,3,6,7,8-HxCDD                 | <1.0         | <0.72             | 96                          |  |
| 1,2,3,7,8,9-HxCDD                 | <1.1         | <0.76             | 99                          |  |
| 1,2,3,4,6,7,8-HpCDD               | <3.0         | <2.0              | 103                         |  |
| OCDD                              | 6.88         | 4.48              | 88                          |  |
| 2,3,7,8-TCDF                      | <1.4         | <1.1              | 88                          |  |
| 1,2,3,7,8-PeCDF                   | <1.1         | <0.83             | 108                         |  |
| 2,3,4,7,8-PeCDF                   | <0.78        | < 0.63            | 98                          |  |
| 1,2,3,4,7,8-HxCDF                 | <0.87        | < 0.49            | 101                         |  |
| 1,2,3,6,7,8-HxCDF                 | 0.870        | <0.57             | 101                         |  |
| 2,3,4,6,7,8-HxCDF                 | <0.94        | < 0.51            | 100                         |  |
| 1,2,3,7,8,9-HxCDF                 | <1.4         | <0.73             | 108                         |  |
| 1,2,3,4,6,7,8-HpCDF               | <1.4         | 1.43              | 103                         |  |
| 1,2,3,4,7,8,9-HpCDF               | <2.3         | <1.8              | 108                         |  |
| OCDF                              | 8.88         | <3.4              | 103                         |  |
| Extraction Standards              | % Rec        | % Rec             | % Rec                       |  |
| 13C12-2,3,7,8-TCDD                | 56           | 57                | 55                          |  |
| 13C12-1,2,3,7,8-PeCDD             | 52           | 59                | 52                          |  |
| 13C12-1,2,3,4,7,8-HxCDD           | 58           | 58                | 69                          |  |
| 13C12-1,2,3,6,7,8-HxCDD           | 69           | 71                | 72                          |  |
| 13C12-1,2,3,4,6,7,8-HpCDD         | 61           | 62                | 57                          |  |
| 13C12-OCDD                        | 48           | 56                | 41                          |  |
| 13C12-2,3,7,8-TCDF                | 58           | 56                | 55                          |  |
| 13C12-1,2,3,7,8-PeCDF             | 55           | 59                | 52                          |  |
| 13C12-2,3,4,7,8-PeCDF             | 56           | 60                | 51                          |  |
| 13C12-1,2,3,4,7,8-HxCDF           | 58           | 57                | 73                          |  |
| 13C12-1,2,3,6,7,8-HxCDF           | 78           | 75                | 74                          |  |
| 13C12-2,3,4,6,7,8-HxCDF           | 69           | 69                | 71                          |  |
| 13C12-1,2,3,7,8,9-HxCDF           | 62           | 61                | 66                          |  |
| 13C12-1,2,3,4,6,7,8-HpCDF         | 64           | 67                | 67                          |  |
| 13C12-1,2,3,4,7,8,9-HpCDF         | 59           | 65                | 59                          |  |
| Cleanup Standard                  | 33           |                   | 33                          |  |
| 37CI4-2,3,7,8-TCDD (Cleanup)      | 42           | 45                | 45                          |  |
| Homologue Group Totals            |              |                   | 43                          |  |
|                                   | pg           | pg                |                             |  |
| Total-TCDD                        | <1.5         | <1.2              |                             |  |
| Total-PeCDD                       | <1.1         | <0.94             |                             |  |
| Total-HxCDD                       | <1.3         | <0.91             |                             |  |
| Total-HpCDD                       | <3.0         | <2.0              |                             |  |
| Total-TCDF                        | <1.4         | <1.1              |                             |  |
| Total-PeCDF                       | <1.1         | < 0.83            |                             |  |
| Total-HxCDF                       | <1.4         | <0.73             |                             |  |
| Total-HpCDF                       | <2.3         | <1.8              |                             |  |
| Toxic Equivalency - (WHO 2005)    |              |                   |                             |  |
| Lower Bound PCDD/F TEQ (WHO 2005) | 0.0917       | 0.0156            |                             |  |
| Mid Point PCDD/F TEQ (WHO 2005)   | 1.96         | 1.53              |                             |  |
| Upper Bound PCDD/F TEQ (WHO 2005) | 3.83         | 2.99              |                             |  |

#### Sample Analysis Report

Sample Name BA-1 L2526958-1 ALS Sample ID Analysis Method Analysis Type EPA 1613B Sample Sample Matrix Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Sample Size Percent Moisture 1 n/a Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1 10-201218A08 Filename 18-Dec-20 19:11 Run Date

Final Volume 10 uL Dilution Factor 1 Analysis Units pg

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | TEF        | Ret.    | Conc.  | EDL    |          | EMPC |     |
|------------------------------|------------|---------|--------|--------|----------|------|-----|
| Target Analytes              | (WHO 2005) | Time    | pg     | pg l   | Flags    | pg   | LQL |
| 2,3,7,8-TCDD                 | 1          | NotFnd  | <1.2   | 1.2    | U        |      | 10  |
| 1,2,3,7,8-PeCDD              | 1          | NotFnd  | < 0.88 | 0.88   | U        |      | 50  |
| 1,2,3,4,7,8-HxCDD            | 0.1        | NotFnd  | <1.3   | 1.3    | U        |      | 50  |
| 1,2,3,6,7,8-HxCDD            | 0.1        | NotFnd  | <1.1   | 1.1    | U        |      | 50  |
| 1,2,3,7,8,9-HxCDD            | 0.1        | NotFnd  | <1.1   | 1.1    | U        |      | 50  |
| 1,2,3,4,6,7,8-HpCDD          | 0.01       | 35.30   | 7.97   | 2.5    | U,M      |      | 50  |
|                              |            |         |        |        |          |      |     |
| OCDD                         | 0.0003     | 36.75   | 35.6   | 4.6    | M,J,B    |      | 100 |
| 2,3,7,8-TCDF                 | 0.1        | NotFnd  | <1.2   | 1.2    | U        |      | 10  |
| 1,2,3,7,8-PeCDF              | 0.03       | NotFnd  | < 0.97 | 0.97   | U        |      | 50  |
| 2,3,4,7,8-PeCDF              | 0.3        | NotFnd  | < 0.73 | 0.73   | U        |      | 50  |
| 1,2,3,4,7,8-HxCDF            | 0.1        | NotFnd  | <1.0   | 1.0    | U        |      | 50  |
| 1,2,3,6,7,8-HxCDF            | 0.1        | NotFnd  | < 0.86 | 0.86   | U        |      | 50  |
| 2,3,4,6,7,8-HxCDF            | 0.1        | NotFnd  | < 0.87 | 0.87   | U        |      | 50  |
| 1,2,3,7,8,9-HxCDF            | 0.1        | NotFnd  | <1.3   | 1.3    | U        |      | 50  |
| 1,2,3,4,6,7,8-HpCDF          | 0.01       | 34.75   | <3.1   | 1.5    | M,J,R    | 3.1  | 50  |
| 1,2,3,4,7,8,9-HpCDF          | 0.01       | 35.53   | <2.9   | 2.9    | M,U      | 2.1  | 50  |
| 1,2,3,4,7,6,9-11PCDI<br>OCDF | 0.0003     | 36.85   | <5.2   | 3.4    | M,J,R    |      | 10  |
|                              |            | 30.03   |        |        | 1-1,5,10 | 3.2  | -   |
| Extraction Standards         | pg         |         | % Rec  |        |          |      |     |
| 13C12-2,3,7,8-TCDD           | 2000       | 26.80   |        | 25-164 |          |      |     |
| 13C12-1,2,3,7,8-PeCDD        | 2000       | 31.51   |        | 25-181 |          |      |     |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000       | 33.65   |        | 32-141 |          |      |     |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000       | 33.71   |        | 28-130 |          |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000       | 35.30   |        | 23-140 |          |      |     |
| 13C12-OCDD                   | 4000       | 36.74   | 44     | 17-157 |          |      |     |
| 13C12-2,3,7,8-TCDF           | 2000       | 25.89   | 58     | 24-169 |          |      |     |
| 13C12-1,2,3,7,8-PeCDF        | 2000       | 30.48   |        | 24-185 |          |      |     |
| 13C12-2,3,4,7,8-PeCDF        | 2000       | 31.27   |        | 21-178 |          |      |     |
| 13C12-1,2,3,4,7,8-HxCDF      | 2000       | 33.13   |        | 26-152 |          |      |     |
| 13C12-1,2,3,6,7,8-HxCDF      | 2000       | 33.21   |        | 26-132 |          |      |     |
| 13C12-2,3,4,6,7,8-HxCDF      | 2000       | 33.55   |        | 28-136 |          |      |     |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000       | 33.97   |        | 29-147 |          |      |     |
|                              | 2000       | 34.75   |        | 28-147 |          |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDF    |            |         |        |        |          |      |     |
| 13C12-1,2,3,4,7,8,9-HpCDF    | 2000       | 35.53   | 45     | 26-138 |          |      |     |
| Cleanup Standard             | pg         |         |        |        |          |      |     |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40         | 26.82   | 47     | 35-197 |          |      |     |
|                              |            |         | Conc.  | EDL    |          |      |     |
| Homologue Group Totals       |            | # peaks | pg     | pg     |          |      |     |
| Total-TCDD                   |            | 0.00    | <1.2   | 1.2    | U        |      | 10  |
| Total-PeCDD                  |            | 0.00    | < 0.88 | 0.88   | U        |      | 50  |
| Total-HxCDD                  |            | 0.00    | <1.3   | 1.3    | U        |      | 50  |
| Total-HpCDD                  |            | 2.00    | 21.7   | 2.5    |          |      | 50  |
| Total-TCDF                   |            | 0.00    | <1.2   | 1.2    | U        |      | 10  |
|                              |            |         |        |        |          |      |     |
| Total-PeCDF                  |            | 0.00    | < 0.97 | 0.97   | U        |      | 50  |
| Total-HxCDF                  |            | 1.00    | 2.35   | 1.3    |          |      | 50  |
| Total-HpCDF                  |            | 0.00    | <2.9   | 2.9    | U        |      | 50  |
|                              |            |         |        |        |          |      |     |
| Toxic Equivalency - (WHO     | 2005)      |         | pg     |        |          |      |     |

Upper Bound PCDD/F TEQ (WHO 2005) 3.35

> Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency М Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL.

Indicates that a target analyte was detected below the calibrated range.

R  $Indicates \ that \ the \ ion \ abundance \ ratio \ for \ this \ compound \ did \ not \ meet \ the \ acceptance \ criterion.$ В Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

Sample Name BA-2
ALS Sample ID L2526958-2
Analysis Method EPA 16138
Analysis Type Sample
Sample Matrix Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1

 $\begin{array}{cccc} Filename & 10-201218A09 \\ Run \ Date & 18-Dec-20 \ 19:53 \\ Final \ Volume & 10 & uL \\ Dilution \ Factor & 1 \\ Analysis \ Units & pg & \\ \end{array}$ 

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | TEF        | Ret.    | Conc.  | EDL    |       | ЕМРС |     |
|------------------------------|------------|---------|--------|--------|-------|------|-----|
| Target Analytes              | (WHO 2005) | Time    | pg     | na     | Flags | pg   | LQL |
|                              |            |         |        |        |       |      |     |
| 2,3,7,8-TCDD                 |            | NotFnd  | <1.4   | 1.4    | U     |      | 10  |
|                              | 1          | NotFnd  | <2.1   | 2.1    | U     |      | 50  |
| 1,2,3,4,7,8-HxCDD            | 0.1        | NotFnd  | <2.8   | 2.8    | U     |      | 50  |
| 1,2,3,6,7,8-HxCDD            | 0.1        | NotFnd  | <2.6   | 2.6    | U     |      | 50  |
| 1,2,3,7,8,9-HxCDD            | 0.1        | 33.83   | <3.2   | 2.6    | M,J,R |      | 50  |
| 1,2,3,4,6,7,8-HpCDD          | 0.01       | 35.31   | <22    | 5.6    | M,J,R | 22   | 50  |
| OCDD                         | 0.0003     | 36.76   | <56    | 12     | M,J,R | 56   | 100 |
| 2,3,7,8-TCDF                 | 0.1        | NotFnd  | <1.5   | 1.5    | U     |      | 10  |
| 1,2,3,7,8-PeCDF              | 0.03       | NotFnd  | <1.3   | 1.3    | U     |      | 50  |
| 2,3,4,7,8-PeCDF              | 0.3        | NotFnd  | < 0.97 | 0.97   | U     |      | 50  |
| 1,2,3,4,7,8-HxCDF            | 0.1        | NotFnd  | <2.1   | 2.1    | U     |      | 50  |
| 1,2,3,6,7,8-HxCDF            | 0.1        | 33.21   | <1.9   | 1.9    | M,U   | 1.1  | 50  |
| 2,3,4,6,7,8-HxCDF            | 0.1        | NotFnd  | <1.7   | 1.7    | Ū     |      | 50  |
| 1,2,3,7,8,9-HxCDF            | 0.1        | NotFnd  | <2.3   | 2.3    | U     |      | 50  |
| 1,2,3,4,6,7,8-HpCDF          | 0.01       | 34.75   | <4.3   | 4.3    | M,U   | 3.7  | 50  |
| 1,2,3,4,7,8,9-HpCDF          | 0.01       | NotFnd  | <9.3   | 9.3    | U     |      | 5   |
| OCDF                         | 0.0003     | 36.83   | 12.0   | 7.1    | м,ј,в |      | 10  |
| Extraction Standards         | pg         |         | % Rec  | Limits |       |      |     |
| 13C12-2,3,7,8-TCDD           | 2000       | 26.80   | 47     | 25-164 |       |      |     |
| 13C12-1,2,3,7,8-PeCDD        | 2000       | 31.51   |        | 25-181 |       |      |     |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000       | 33.65   |        | 32-141 |       |      |     |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000       | 33.71   | 30     | 28-130 |       |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000       | 35.30   | 29     | 23-140 |       |      |     |
| 13C12-OCDD                   | 4000       | 36.75   | 30     | 17-157 |       |      |     |
| 13C12-2,3,7,8-TCDF           | 2000       | 25.88   | 50     | 24-169 |       |      |     |
| 13C12-1,2,3,7,8-PeCDF        | 2000       | 30.48   |        | 24-185 |       |      |     |
| 13C12-2,3,4,7,8-PeCDF        | 2000       | 31.27   |        | 21-178 |       |      |     |
| 13C12-1,2,3,4,7,8-HxCDF      | 2000       | 33.13   |        | 26-152 |       |      |     |
| 13C12-1,2,3,6,7,8-HxCDF      | 2000       | 33.21   |        | 26-123 |       |      |     |
| 13C12-2,3,4,6,7,8-HxCDF      | 2000       | 33.55   |        | 28-136 |       |      |     |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000       | 33.97   |        | 29-147 |       |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDF    | 2000       | 34.75   | 29     | 28-143 |       |      |     |
| 13C12-1,2,3,4,7,8,9-HpCDF    | 2000       | 35.53   | 19     | 26-138 |       |      |     |
| Cleanup Standard             | pg         |         |        |        |       |      |     |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40         | 26.82   | 35     | 35-197 |       |      |     |
|                              |            |         | Conc.  | EDL    |       |      |     |
| Homologue Group Totals       |            | # peaks | pg     | pg     |       |      |     |
| Total-TCDD                   |            | 0.00    | <1.4   | 1.4    | U     |      | 10  |
| Total-PeCDD                  |            | 0.00    | <2.1   | 2.1    | U     |      | 50  |
|                              |            |         |        |        | U     |      | 50  |
| Total-HxCDD<br>Total-HpCDD   |            | 1.00    | 8.68   | 2.8    |       |      | 50  |
|                              |            | 1.00    | 34.1   | 5.6    |       |      |     |
| Total-TCDF                   |            | 0.00    | <1.5   | 1.5    | U     |      | 10  |
| Total-PeCDF                  |            | 0.00    | <1.3   | 1.3    | U     |      | 50  |
| Total-HxCDF                  |            | 1.00    | 2.49   | 2.3    |       |      | 50  |
| Total-HpCDF                  |            | 0.00    | <9.3   | 9.3    | U     |      | 50  |
| Toxic Equivalency - (WHO     | 2005)      |         | pg     |        | _     |      |     |

 Toxic Equivalency - (WHO 2005)
 pg

 Lower Bound PCDD/F TEQ (WHO 2005)
 0.00360

 Mid Point PCDD/F TEQ (WHO 2005)
 3.29

 Upper Bound PCDD/F TEQ (WHO 2005)
 6.02

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.

TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency

M Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

J Indicates that a target analyte was detected below the calibrated range.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
QL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

BA-3-BLANK Sample Name L2526958-3 ALS Sample ID Analysis Method Analysis Type EPA 1613B Sample Sample Matrix Swab

Sampling Date 3-Nov-20 25-Nov-20 Extraction Date

Sample Size Percent Moisture 1 n/a Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1

10-201218A10 Filename Run Date 18-Dec-20 20:35 10 uL Final Volume Dilution Factor 1 Analysis Units pg

Instrument - Column HRMS-10 DB5MSUSO287833H

| 2,3,7,8-TCDE 1,2,3,7,8-PeCDE 1,2,3,4,7,8-HxCDE 1,2,3,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,7,8-PCDE 1,2,3,7,8-PeCDE 1,2,3,7,8-PeCDE 1,2,3,4,7,8-PeCDE 1,2,3,4,7,8-HxCDE 1,2,3,4,7,8-HxCDE 1,2,3,4,7,8-HxCDE 1,2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE | 1<br>0.1<br>0.1<br>0.1<br>0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1 | NotEnd<br>NotEnd<br>NotEnd<br>NotEnd<br>NotEnd<br>NotEnd<br>36.74<br>NotEnd<br>NotEnd<br>NotEnd<br>NotEnd<br>NotEnd<br>NotEnd | <pre>Pg &lt;1.0 &lt;0.77 &lt;0.74 &lt;0.65 &lt;0.66 &lt;1.5 &lt;2.2 &lt;1.0 &lt;0.64 &lt;0.47 &lt;0.45 &lt;0.43</pre> | pg F<br>1.0<br>0.77<br>0.74<br>0.65<br>0.66<br>1.5<br>2.2<br>1.0<br>0.64<br>0.47 | ************************************** | <b>pg</b>      | 10<br>50<br>50<br>50<br>50<br>50                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------|----------------|-------------------------------------------------------------------------------------------------------|
| 1,2,3,7,8-PeCDE 1,2,3,4,7,8-HxCDE 1,2,3,7,8,9-HxCDE 2,3,4,6,7,8-HpCDE 2,3,7,8-PCDE 1,2,3,7,8-PeCDE 1,2,3,4,7,8-PeCDE 1,2,3,4,7,8-HxCDE 1,2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HyCDE 2,3,4,6,7,8-HpCDE 2,3,4,6,7,8-HpCDE                                                                                  | 1<br>0.1<br>0.1<br>0.1<br>0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1 | NotFnd NotFnd NotFnd NotFnd 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd                                            | <0.77 <0.74 <0.65 <0.66 <1.5 <2.2 <1.0 <0.64 <0.47 <0.45                                                              | 0.77<br>0.74<br>0.65<br>0.66<br>1.5<br>2.2<br>1.0                                | U<br>U<br>U<br>U<br>M,U                | 1.8            | 50<br>50<br>50<br>50                                                                                  |
| 1,2,3,7,8-PeCDE 1,2,3,4,7,8-HxCDE 1,2,3,7,8,9-HxCDE 2,3,4,6,7,8-HpCDE 2,3,7,8-PCDE 1,2,3,7,8-PeCDE 1,2,3,4,7,8-PeCDE 1,2,3,4,7,8-HxCDE 1,2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HxCDE 2,3,4,6,7,8-HyCDE 2,3,4,6,7,8-HpCDE 2,3,4,6,7,8-HpCDE                                                                                  | 1<br>0.1<br>0.1<br>0.1<br>0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1 | NotFnd NotFnd NotFnd NotFnd 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd                                            | <0.77 <0.74 <0.65 <0.66 <1.5 <2.2 <1.0 <0.64 <0.47 <0.45                                                              | 0.77<br>0.74<br>0.65<br>0.66<br>1.5<br>2.2<br>1.0                                | U<br>U<br>U<br>U<br>M,U                | 1.8            | 50<br>50<br>50<br>50                                                                                  |
| 1,2,3,4,7,8-HxCDE<br>1,2,3,6,7,8-HxCDE<br>1,2,3,4,6,7,8-HyCDE<br>2,3,4,6,7,8-HyCDE<br>1,2,3,7,8-PeCDi<br>1,2,3,4,7,8-PeCDi<br>1,2,3,4,7,8-HxCDi<br>1,2,3,4,7,8-HxCDi<br>1,2,3,4,6,7,8-HxCDi<br>1,2,3,4,6,7,8-HxCDi<br>2,3,4,6,7,8-HyCDi<br>2,3,4,6,7,8-HyCDi<br>2,3,4,6,7,8-HyCDi<br>2,3,4,6,7,8-HyCDi                                | 0.1<br>0.1<br>0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1<br>0.1      | NotFnd NotFnd NotFnd 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd                                            | <0.65<br><0.66<br><1.5<br><2.2<br><1.0<br><0.64<br><0.47<br><0.45                                                     | 0.65<br>0.66<br>1.5<br>2.2<br>1.0<br>0.64                                        | U<br>U<br>W,U                          | 1.8            | 50<br>50                                                                                              |
| 1,2,3,6,7,8-HxCDE<br>1,2,3,7,8,9-HxCDE<br>2,3,4,6,7,8-HpCDE<br>2,3,7,8-TCDI<br>1,2,3,7,8-PeCDI<br>1,2,3,4,7,8-HxCDI<br>1,2,3,6,7,8-HxCDI<br>1,2,3,6,7,8-HxCDI<br>1,2,3,6,7,8-HxCDI<br>1,2,3,4,7,8,9-HxCDI<br>2,3,4,6,7,8-HxCDI<br>2,3,4,6,7,8-HxCDI                                                                                   | 0.1<br>0.1<br>0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1<br>0.1      | NotFnd NotFnd 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd                                                          | <0.65<br><0.66<br><1.5<br><2.2<br><1.0<br><0.64<br><0.47<br><0.45                                                     | 0.65<br>0.66<br>1.5<br>2.2<br>1.0<br>0.64                                        | U<br>U<br>W,U                          | 1.8            | 50<br>50                                                                                              |
| 1,2,3,7,8,9-HxCDE<br>2,3,4,6,7,8-HpCDE<br>2,3,4,6,7,8-TCDE<br>1,2,3,7,8-PeCDE<br>2,3,4,7,8-PeCDE<br>1,2,3,4,7,8-HxCDE<br>1,2,3,4,6,7,8-HxCDE<br>1,2,3,4,6,7,8-HxCDE<br>1,2,3,4,6,7,8-HpCDE<br>2,3,4,6,7,8-HpCDE                                                                                                                       | 0.1<br>0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1                    | NotFnd NotFnd 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd                                                          | <0.66<br><1.5<br><2.2<br><1.0<br><0.64<br><0.47<br><0.45                                                              | 0.66<br>1.5<br>2.2<br>1.0<br>0.64                                                | υ<br>υ<br>Μ,υ                          | 1.8            | 50                                                                                                    |
| 2,3,4,6,7,8-HpCDE<br>QCDE<br>2,3,7,8-FeCDi<br>1,2,3,4,7,8-PeCDi<br>1,2,3,4,7,8-HxCDi<br>1,2,3,6,7,8-HxCDi<br>1,2,3,7,8,9-HxCDi<br>2,3,4,6,7,8-HpCDi<br>2,3,4,6,7,8-HpCDi<br>2,3,4,6,7,8-HpCDi                                                                                                                                         | 0.01<br>0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1<br>0.1                    | NotFnd 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd NotFnd                                                                        | <1.5<br><2.2<br><1.0<br><0.64<br><0.47<br><0.45                                                                       | 1.5<br>2.2<br>1.0<br>0.64                                                        | U<br>M,U                               | 1.8            |                                                                                                       |
| OCDE  2,3,7,8-TCDi  1,2,3,7,8-PeCDi  2,3,4,7,8-PeCDi 1,2,3,6,7,8-HxCDi 2,3,4,6,7,8-HxCDi 1,2,3,7,8,9-HxCDi 2,3,4,6,7,8-HyCDi 2,3,4,6,7,8-HyCDi 2,3,4,6,7,8-HyCDi 2,3,4,6,7,8-HyCDi                                                                                                                                                    | 0.0003<br>0.1<br>0.03<br>0.3<br>0.1<br>0.1<br>0.1<br>0.1                            | 36.74 NotFnd NotFnd NotFnd NotFnd NotFnd                                                                                      | <2.2<br><1.0<br><0.64<br><0.47<br><0.45                                                                               | 2.2<br>1.0<br>0.64                                                               | M,U                                    | 1.8            |                                                                                                       |
| 1,2,3,7,8-PeCDf<br>2,3,4,7,8-PeCDf<br>1,2,3,4,7,8-HxCDf<br>1,2,3,6,7,8-HxCDf<br>2,3,4,6,7,8-HxCDf<br>1,2,3,7,8,9-HxCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,7,8,9-HpCDf                                                                                                                                                 | 0.03<br>0.3<br>0.1<br>0.1<br>0.1<br>0.1<br>0.01                                     | NotFnd<br>NotFnd<br>NotFnd<br>NotFnd<br>NotFnd                                                                                | <0.64<br><0.47<br><0.45                                                                                               | 0.64                                                                             |                                        |                | 100                                                                                                   |
| 1,2,3,7,8-PeCDf<br>2,3,4,7,8-PeCDf<br>1,2,3,4,7,8-HxCDf<br>1,2,3,6,7,8-HxCDf<br>2,3,4,6,7,8-HxCDf<br>1,2,3,7,8,9-HxCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,7,8,9-HpCDf                                                                                                                                                 | 0.03<br>0.3<br>0.1<br>0.1<br>0.1<br>0.1<br>0.01                                     | NotFnd<br>NotFnd<br>NotFnd<br>NotFnd<br>NotFnd                                                                                | <0.64<br><0.47<br><0.45                                                                                               | 0.64                                                                             |                                        |                | 10                                                                                                    |
| 2,3,4,7,8-PeCDf<br>1,2,3,4,7,8-HxCDf<br>1,2,3,6,7,8-HxCDf<br>2,3,4,6,7,8-HxCDf<br>1,2,3,7,8,9-HxCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,7,8,9-HpCDf                                                                                                                                                                    | 0.3<br>0.1<br>0.1<br>0.1<br>0.1<br>0.1                                              | NotFnd<br>NotFnd<br>NotFnd<br>NotFnd                                                                                          | <0.47<br><0.45                                                                                                        |                                                                                  | U                                      |                | 50                                                                                                    |
| 1,2,3,4,7,8-HxCDf<br>1,2,3,6,7,8-HxCDf<br>2,3,4,6,7,8-HxCDf<br>1,2,3,7,8,9-HxCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,7,8,9-HpCDf                                                                                                                                                                                       | 0.1<br>0.1<br>0.1<br>0.1<br>0.01                                                    | NotFnd<br>NotFnd<br>NotFnd                                                                                                    | < 0.45                                                                                                                |                                                                                  | U                                      |                | 50                                                                                                    |
| 1,2,3,6,7,8-HxCDf<br>2,3,4,6,7,8-HxCDf<br>1,2,3,7,8,9-HxCDf<br>2,3,4,6,7,8-HpCDf<br>2,3,4,7,8,9-HpCDf                                                                                                                                                                                                                                 | 0.1<br>0.1<br>0.1<br>0.01                                                           | NotFnd<br>NotFnd                                                                                                              |                                                                                                                       | 0.45                                                                             | U                                      |                | 50                                                                                                    |
| 2,3,4,6,7,8-HxCDF<br>1,2,3,7,8,9-HxCDF<br>2,3,4,6,7,8-HpCDF<br>2,3,4,7,8,9-HpCDF                                                                                                                                                                                                                                                      | 0.1<br>0.1<br>0.01                                                                  | NotFnd                                                                                                                        |                                                                                                                       | 0.43                                                                             | U                                      |                | 50                                                                                                    |
| 1,2,3,7,8,9-HxCDF<br>2,3,4,6,7,8-HpCDF<br>2,3,4,7,8,9-HpCDF                                                                                                                                                                                                                                                                           | 0.1<br>0.01                                                                         |                                                                                                                               | <0.45                                                                                                                 | 0.45                                                                             | U                                      |                | 50                                                                                                    |
| 2,3,4,6,7,8-HpCDF<br>2,3,4,7,8,9-HpCDF                                                                                                                                                                                                                                                                                                | 0.01                                                                                |                                                                                                                               | < 0.67                                                                                                                | 0.43                                                                             | U                                      |                | 50                                                                                                    |
| 2,3,4,7,8,9-HpCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | NotFnd                                                                                                                        | <1.3                                                                                                                  | 1.3                                                                              | U                                      |                | 50                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                       | 0.01                                                                                | NotFnd                                                                                                                        | <2.0                                                                                                                  | 2.0                                                                              | U                                      |                | 50                                                                                                    |
| OCD                                                                                                                                                                                                                                                                                                                                   | 0.0003                                                                              | NotFnd                                                                                                                        | <2.0                                                                                                                  | 2.3                                                                              | U                                      |                | 10                                                                                                    |
| Standards                                                                                                                                                                                                                                                                                                                             |                                                                                     |                                                                                                                               | % Rec                                                                                                                 |                                                                                  |                                        |                | 100                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                       | pg                                                                                  |                                                                                                                               |                                                                                                                       |                                                                                  |                                        |                |                                                                                                       |
| C12-2,3,7,8-TCDE                                                                                                                                                                                                                                                                                                                      |                                                                                     | 26.80                                                                                                                         |                                                                                                                       | 25-164                                                                           |                                        |                |                                                                                                       |
| 2-1,2,3,7,8-PeCDD                                                                                                                                                                                                                                                                                                                     |                                                                                     | 31.50<br>33.64                                                                                                                |                                                                                                                       | 25-181<br>32-141                                                                 |                                        |                |                                                                                                       |
| L,2,3,4,7,8-HxCDE<br>L,2,3,6,7,8-HxCDE                                                                                                                                                                                                                                                                                                |                                                                                     | 33.70                                                                                                                         |                                                                                                                       | 28-130                                                                           |                                        |                |                                                                                                       |
| 2,3,4,6,7,8-HpCDD                                                                                                                                                                                                                                                                                                                     | 2000                                                                                | 35.30                                                                                                                         |                                                                                                                       | 23-140                                                                           |                                        |                |                                                                                                       |
| 13C12-OCDE                                                                                                                                                                                                                                                                                                                            |                                                                                     | 36.74                                                                                                                         |                                                                                                                       | 17-157                                                                           |                                        |                |                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                       |                                                                                     |                                                                                                                               |                                                                                                                       |                                                                                  |                                        |                |                                                                                                       |
| C12-2,3,7,8-TCDF                                                                                                                                                                                                                                                                                                                      |                                                                                     | 25.88                                                                                                                         |                                                                                                                       | 24-169                                                                           |                                        |                |                                                                                                       |
| 2-1,2,3,7,8-PeCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | 30.47                                                                                                                         |                                                                                                                       | 24-185                                                                           |                                        |                |                                                                                                       |
| 2-2,3,4,7,8-PeCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | 31.27                                                                                                                         |                                                                                                                       | 21-178                                                                           |                                        |                |                                                                                                       |
| 1,2,3,4,7,8-HxCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | 33.13                                                                                                                         |                                                                                                                       | 26-152                                                                           |                                        |                |                                                                                                       |
| 1,2,3,6,7,8-HxCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | 33.21                                                                                                                         |                                                                                                                       | 26-123                                                                           |                                        |                |                                                                                                       |
| 2,3,4,6,7,8-HxCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | 33.55                                                                                                                         |                                                                                                                       | 28-136                                                                           |                                        |                |                                                                                                       |
| 1,2,3,7,8,9-HxCDF                                                                                                                                                                                                                                                                                                                     |                                                                                     | 33.97                                                                                                                         |                                                                                                                       | 29-147                                                                           |                                        |                |                                                                                                       |
| 2,3,4,6,7,8-HpCDF<br>2,3,4,7,8,9-HpCDF                                                                                                                                                                                                                                                                                                |                                                                                     | 34.74<br>35.53                                                                                                                |                                                                                                                       | 28-143<br>26-138                                                                 |                                        |                |                                                                                                       |
| tandard                                                                                                                                                                                                                                                                                                                               |                                                                                     | 55.55                                                                                                                         | 02                                                                                                                    | 20 100                                                                           |                                        |                |                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                       | pg                                                                                  |                                                                                                                               |                                                                                                                       |                                                                                  |                                        |                |                                                                                                       |
| 8-TCDD (Cleanup)                                                                                                                                                                                                                                                                                                                      | 40                                                                                  | 26.81                                                                                                                         |                                                                                                                       | 35-197                                                                           |                                        |                |                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                       |                                                                                     |                                                                                                                               | Conc.                                                                                                                 | EDL                                                                              |                                        |                |                                                                                                       |
| e Group Totals                                                                                                                                                                                                                                                                                                                        |                                                                                     | # peaks                                                                                                                       | pg                                                                                                                    | pg                                                                               |                                        |                |                                                                                                       |
| Total-TCDE                                                                                                                                                                                                                                                                                                                            |                                                                                     | 0.00                                                                                                                          | <1.0                                                                                                                  | 1.0                                                                              | U                                      |                | 10                                                                                                    |
| Total-PeCDD                                                                                                                                                                                                                                                                                                                           |                                                                                     | 0.00                                                                                                                          | < 0.77                                                                                                                | 0.77                                                                             | U                                      |                | 50                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                       |                                                                                     | 0.00                                                                                                                          | < 0.74                                                                                                                | 0.74                                                                             | U                                      |                | 50                                                                                                    |
| Total-HxCDD                                                                                                                                                                                                                                                                                                                           |                                                                                     | 0.00                                                                                                                          | <1.5                                                                                                                  | 1.5                                                                              | U                                      |                | 50                                                                                                    |
| Total-HxCDD<br>Total-HpCDD                                                                                                                                                                                                                                                                                                            |                                                                                     | 0.00                                                                                                                          | <1.0                                                                                                                  | 1.0                                                                              | U                                      |                | 10                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                       |                                                                                     |                                                                                                                               |                                                                                                                       | 0.64                                                                             | U                                      |                | 50                                                                                                    |
| Total-HpCDD<br>Total-TCDF                                                                                                                                                                                                                                                                                                             |                                                                                     |                                                                                                                               |                                                                                                                       |                                                                                  |                                        |                | 50                                                                                                    |
| Total-HpCDD                                                                                                                                                                                                                                                                                                                           |                                                                                     | 0.00                                                                                                                          | <2.0                                                                                                                  | 2.0                                                                              | U                                      |                | 50                                                                                                    |
| Total-HpCDD<br>Total-TCDF<br>Total-PeCDF                                                                                                                                                                                                                                                                                              |                                                                                     |                                                                                                                               |                                                                                                                       |                                                                                  |                                        |                |                                                                                                       |
| Total-HpCDE<br>Total-TCDF<br>Total-PeCDF<br>Total-HxCDF<br>Total-HpCDF                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                                               | pg                                                                                                                    |                                                                                  |                                        |                |                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                       |                                                                                     | 2005)                                                                                                                         | 0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00                                                                          | 0.00 <0.74<br>0.00 <1.5<br>0.00 <1.0<br>0.00 <0.64<br>0.00 <0.67<br>0.00 <2.0    | 0.00     <0.74                         | 0.00     <0.74 | 0.00 <0.74 0.74 U 0.00 <1.5 1.5 U 0.00 <1.0 1.0 U 0.00 <0.64 0.64 U 0.00 <0.67 0.67 U 0.00 <2.0 2.0 U |

Mid Point PCDD/F TEQ (WHO 2005)
Upper Bound PCDD/F TEQ (WHO 2005) 1.24 2.48

Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency

М Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

 $Lower\ Quantification\ Limit,\ based\ on\ the\ lowest\ calibration\ level\ corrected\ for\ sample\ size,\ splits\ and\ dilutions.$ LQL EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

**356-4** L2526958-4 Sample Name ALS Sample ID Analysis Method Analysis Type EPA 1613B Sample Sample Matrix Swab

Sampling Date Extraction Date Sample Size Percent Moisture 3-Nov-20 25-Nov-20

1 n/a Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1

LQL EMPC

10-201218A11 Filename Run Date 18-Dec-20 21:17 10 uL Final Volume Dilution Factor 1 Analysis Units pg

Instrument - Column HRMS-10 DB5MSUSO287833H

|                                                      | TEF          | Ret.                       | Conc.          | EDL              |             | EMPC     |          |
|------------------------------------------------------|--------------|----------------------------|----------------|------------------|-------------|----------|----------|
| Target Analytes                                      | (WHO 2005)   |                            | pg             |                  | Flags       | pg       | LQL      |
| -                                                    |              | -                          |                |                  |             | F 3      |          |
| 2,3,7,8-TCDD                                         | 1            | NotFnd<br>NotFnd           | <0.92          | 0.92<br>0.75     | U           |          | 10<br>50 |
| 1,2,3,7,8-PeCDD<br>1,2,3,4,7,8-HxCDD                 | 0.1          | NotFnd<br>NotFnd           | <0.75<br><0.68 | 0.75             | U           |          | 50       |
| 1,2,3,4,7,8-HXCDD<br>1,2,3,6,7,8-HXCDD               | 0.1          | NotFnd                     | < 0.59         | 0.59             | U           |          | 50<br>50 |
| 1,2,3,7,8,9-HxCDD                                    | 0.1          | NotFind                    | < 0.60         | 0.60             | U           |          | 50       |
| 1,2,3,4,6,7,8-HpCDD                                  | 0.01         | NotFnd                     | <1.8           | 1.8              | U           |          | 50       |
| 0CDD                                                 | 0.0003       | 36.75                      | <3.6           | 3.6              |             | 2.8      | 100      |
|                                                      |              |                            |                |                  |             |          |          |
| 2,3,7,8-TCDF                                         | 0.1          | NotFnd                     | < 0.89         | 0.89             | U           |          | 10       |
| 1,2,3,7,8-PeCDF                                      | 0.03         | NotFnd                     | < 0.69         | 0.69             | U           |          | 50       |
| 2,3,4,7,8-PeCDF                                      | 0.3          | NotFnd<br>NotFnd           | <0.55<br><0.53 | 0.55<br>0.53     | U<br>U      |          | 50<br>50 |
| 1,2,3,4,7,8-HxCDF<br>1,2,3,6,7,8-HxCDF               | 0.1<br>0.1   | NotFnd<br>NotFnd           | < 0.49         | 0.53             | U           |          | 50       |
| 2,3,4,6,7,8-HxCDF                                    | 0.1          | 33.55                      | < 0.54         | 0.54             | M,U         | 0.45     | 50       |
| 1,2,3,7,8,9-HxCDF                                    | 0.1          | 33.97                      | 1.02           | 0.83             | M,J         | 0.15     | 50       |
| 1,2,3,4,6,7,8-HpCDF                                  | 0.01         | NotFnd                     | <1.1           | 1.1              | U           |          | 50       |
| 1,2,3,4,7,8,9-HpCDF                                  | 0.01         | NotFnd                     | <1.8           | 1.8              | U           |          | 50       |
| OCDF                                                 | 0.0003       | NotFnd                     | <3.3           | 3.3              | Ü           |          | 10       |
| Extraction Standards                                 | pg           |                            | % Rec          |                  |             |          |          |
|                                                      |              |                            |                |                  |             |          |          |
| 13C12-2,3,7,8-TCDD                                   | 2000         | 26.80                      |                | 25-164           |             |          |          |
| 13C12-1,2,3,7,8-PeCDD                                | 2000<br>2000 | 31.50<br>33.64             |                | 25-181<br>32-141 |             |          |          |
| 13C12-1,2,3,4,7,8-HxCDD<br>13C12-1,2,3,6,7,8-HxCDD   | 2000         | 33.70                      |                | 28-130           |             |          |          |
| 13C12-1,2,3,4,6,7,8-HpCDD                            | 2000         | 35.29                      |                | 23-140           |             |          |          |
| 13C12-OCDD                                           | 4000         | 36.74                      |                | 17-157           |             |          |          |
|                                                      |              |                            |                |                  |             |          |          |
| 13C12-2,3,7,8-TCDF                                   | 2000         | 25.88                      |                | 24-169           |             |          |          |
| 13C12-1,2,3,7,8-PeCDF                                | 2000<br>2000 | 30.47<br>31.27             |                | 24-185<br>21-178 |             |          |          |
| 13C12-2,3,4,7,8-PeCDF<br>13C12-1,2,3,4,7,8-HxCDF     | 2000         | 31.27                      |                | 26-152           |             |          |          |
| 13C12-1,2,3,4,7,8-HXCDF<br>13C12-1,2,3,6,7,8-HXCDF   | 2000         | 33.13                      |                | 26-152           |             |          |          |
| 13C12-2,3,4,6,7,8-HxCDF                              | 2000         | 33.55                      |                | 28-136           |             |          |          |
| 13C12-1,2,3,7,8,9-HxCDF                              | 2000         | 33.97                      |                | 29-147           |             |          |          |
| 13C12-1,2,3,4,6,7,8-HpCDF                            | 2000         | 34.74                      |                | 28-143           |             |          |          |
| 13C12-1,2,3,4,7,8,9-HpCDF                            | 2000         | 35.53                      |                | 26-138           |             |          |          |
| Cleanup Standard                                     | pg           |                            |                |                  |             |          |          |
| 37Cl4-2,3,7,8-TCDD (Cleanup)                         | 40           | 26.82                      | 40             | 35-197           |             |          |          |
| 37CI4-2,3,7,8-1CDD (Cleanup)                         | 40           | 20.02                      | 49             | 35-197           |             |          |          |
|                                                      |              |                            | Conc.          | EDL              |             |          |          |
| Homologue Group Totals                               |              | # peaks                    | pg             | pg               |             |          |          |
| Total-TCDD                                           |              | 0.00                       | < 0.92         | 0.92             | U           |          | 10       |
| Total-PeCDD                                          |              | 0.00                       | < 0.75         | 0.75             | U           |          | 50       |
| Total-HxCDD                                          |              | 0.00                       | <0.68          | 0.68             | U           |          | 50       |
| Total-HpCDD                                          |              | 0.00                       | <1.8           | 1.8              | U           |          | 50       |
| Total-TCDF                                           |              | 0.00                       | < 0.89         | 0.89             | U           |          | 10       |
| Total-PeCDF                                          |              | 0.00                       | < 0.69         | 0.69             | U           |          | 50       |
| Total-HxCDF                                          |              | 1.00                       | 1.02           | 0.83             |             |          | 50       |
| Total-HpCDF                                          |              | 0.00                       | <1.8           | 1.8              | U           |          | 50       |
| Toxic Equivalency - (WHO                             | 2005)        |                            | pg             |                  |             |          |          |
| Lower Bound PCDD/F TEQ (                             |              |                            | 0.102          |                  |             |          |          |
| Mid Point PCDD/F TEQ (WH<br>Upper Bound PCDD/F TEQ ( | O 2005)      |                            | 1.27<br>2.44   |                  |             |          |          |
|                                                      |              | Tadiostos                  | bb a Cations   | stad Data        | abla a Lina | : b      |          |
| EDL<br>TEF                                           |              | Indicates t<br>Indicates t |                |                  |             |          | on the   |
| M                                                    |              | Indicates t                |                |                  |             |          | rated    |
| U                                                    |              | Indicates t                |                |                  |             |          |          |
|                                                      |              | indicates t                |                | o.npounu         | .,43 1100   | actoric. | . 45046  |
| J                                                    |              | Indicates t                | that a tard    | jet analyt       | e was de    | tected b | elow the |
|                                                      |              |                            |                |                  |             |          |          |

 $\ \ \, \text{Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. }$ Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

Sample Name356-5ALS Sample IDL2526958-5Analysis MethodEPA 1613BAnalysis TypeSampleSample MatrixSwab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Sample Size 1
Percent Moisture n/a
Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | TEF        | Ret.    | Conc.  | EDL    |       | ЕМРС |     |
|------------------------------|------------|---------|--------|--------|-------|------|-----|
| Target Analytes              | (WHO 2005) | Time    | pg     |        | Flags | pg   | LQL |
|                              |            |         |        |        |       |      |     |
| 2,3,7,8-TCDD                 |            | NotFnd  | <1.1   | 1.1    | U     |      | 10  |
| 1,2,3,7,8-PeCDD              | 1          | NotFnd  | < 0.97 | 0.97   | U     |      | 50  |
| 1,2,3,4,7,8-HxCDD            | 0.1        | NotFnd  | <1.2   | 1.2    | U     |      | 50  |
| 1,2,3,6,7,8-HxCDD            | 0.1        | NotFnd  | <1.1   | 1.1    | U     |      | 50  |
| 1,2,3,7,8,9-HxCDD            | 0.1        | NotFnd  | <1.1   | 1.1    | U     |      | 50  |
| 1,2,3,4,6,7,8-HpCDD          | 0.01       | NotFnd  | <3.3   | 3.3    | U     |      | 50  |
| OCDD                         | 0.0003     | 36.74   | 6.53   | 5.3    | M,J,B |      | 100 |
| 2,3,7,8-TCDF                 | 0.1        | NotFnd  | <1.1   | 1.1    | U     |      | 10  |
| 1,2,3,7,8-PeCDF              | 0.03       | NotFnd  | < 0.63 | 0.63   | U     |      | 50  |
| 2,3,4,7,8-PeCDF              | 0.3        | NotFnd  | < 0.49 | 0.49   | U     |      | 50  |
| 1,2,3,4,7,8-HxCDF            | 0.1        | NotFnd  | < 0.71 | 0.71   | U     |      | 50  |
| 1,2,3,6,7,8-HxCDF            | 0.1        | NotFnd  | < 0.66 | 0.66   | U     |      | 50  |
| 2,3,4,6,7,8-HxCDF            | 0.1        | NotFnd  | < 0.72 | 0.72   | U     |      | 50  |
| 1,2,3,7,8,9-HxCDF            | 0.1        | NotFnd  | <1.2   | 1.2    | U     |      | 50  |
| 1,2,3,4,6,7,8-HpCDF          | 0.01       | 34.76   | <1.2   | 1.2    |       | 1.1  | 50  |
| 1,2,3,4,7,8,9-HpCDF          | 0.01       | NotFnd  | <1.8   | 1.8    | U     | 1.1  | 50  |
| OCDF                         | 0.0003     | NotFnd  | <4.6   | 4.6    | U     |      | 1   |
|                              |            |         |        |        |       |      |     |
| Extraction Standards         | pg         |         | % Rec  | Limits |       |      |     |
| 13C12-2,3,7,8-TCDD           | 2000       | 26.81   |        | 25-164 |       |      |     |
| 13C12-1,2,3,7,8-PeCDD        | 2000       | 31.51   |        | 25-181 |       |      |     |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000       | 33.65   |        | 32-141 |       |      |     |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000       | 33.71   |        | 28-130 |       |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000       | 35.31   |        | 23-140 |       |      |     |
| 13C12-OCDD                   | 4000       | 36.76   | 44     | 17-157 |       |      |     |
| 13C12-2,3,7,8-TCDF           | 2000       | 25.89   | 53     | 24-169 |       |      |     |
| 13C12-1,2,3,7,8-PeCDF        | 2000       | 30.48   |        | 24-185 |       |      |     |
| 13C12-2,3,4,7,8-PeCDF        | 2000       | 31.28   |        | 21-178 |       |      |     |
| 13C12-1,2,3,4,7,8-HxCDF      | 2000       | 33.15   |        | 26-152 |       |      |     |
| 13C12-1,2,3,6,7,8-HxCDF      | 2000       | 33.22   |        | 26-123 |       |      |     |
| 13C12-2,3,4,6,7,8-HxCDF      | 2000       | 33.56   |        | 28-136 |       |      |     |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000       | 33.98   |        | 29-147 |       |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDF    | 2000       | 34.75   |        | 28-143 |       |      |     |
| 13C12-1,2,3,4,7,8,9-HpCDF    | 2000       | 35.54   |        | 26-138 |       |      |     |
| Cleanup Standard             | pg         |         |        |        |       |      |     |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40         | 26.82   | 20     | 35-197 |       |      |     |
| 37CI4-2,3,7,6-1CDD (Cleanup) | 40         | 20.02   |        |        |       |      |     |
|                              |            |         | Conc.  | EDL    |       |      |     |
| Homologue Group Totals       |            | # peaks | pg     | pg     |       |      |     |
| Total-TCDD                   |            | 0.00    | <1.1   | 1.1    | U     |      | 10  |
| Total-PeCDD                  |            | 0.00    | < 0.97 | 0.97   | U     |      | 50  |
| Total-HxCDD                  |            | 0.00    | <1.2   | 1.2    | U     |      | 50  |
| Total-HpCDD                  |            | 0.00    | <3.3   | 3.3    | U     |      | 50  |
| Total-TCDF                   |            | 0.00    | <1.1   | 1.1    | U     |      | 10  |
| Total-PeCDF                  |            | 0.00    | <0.63  | 0.63   | U     |      | 50  |
| Total-HxCDF                  |            |         | <1.2   |        | U     |      | 50  |
|                              |            | 0.00    |        | 1.2    | U     |      | 50  |
| Total-HpCDF                  |            | 0.00    | <1.8   | 1.8    | U     |      | 50  |
| Tanks Fanderlands (MUO       | 200        |         |        |        |       |      |     |

 Toxic Equivalency - (WHO 2005)
 pg

 Lower Bound PCDD/F TEQ (WHO 2005)
 0.00196

 Mid Point PCDD/F TEQ (WHO 2005)
 1.54

 Upper Bound PCDD/F TEQ (WHO 2005)
 3.08

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.

TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency

M Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

J Indicates that a target analyte was detected below the calibrated range.

B Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

Sample Name ENG-558-DFP-02 L2526958-6 ALS Sample ID Analysis Method Analysis Type

Sample Matrix

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size Percent Moisture 1 n/a Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1 10-201218A13 Filename

18-Dec-20 22:42 Run Date Final Volume 10 uL Dilution Factor 1 Analysis Units pg

Swab

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | TEF            | Ret.            | Conc.        | EDL        |            | EMPC |          |
|------------------------------|----------------|-----------------|--------------|------------|------------|------|----------|
| Target Analytes              | (WHO 2005)     | Time            | pg           | pa F       | Flags      | pg   | LQL      |
|                              |                |                 |              |            |            |      |          |
|                              | 1              | NotFnd          | <1.1         | 1.1        | U          |      | 10       |
|                              | 1              | NotFnd          | <1.0         | 1.0        | U          |      | 50       |
| 1,2,3,4,7,8-HxCDD            | 0.1            | NotFnd          | <1.1         | 1.1        | U          |      | 50       |
| 1,2,3,6,7,8-HxCDD            | 0.1            | NotFnd          | <1.0         | 1.0        | U          |      | 50       |
| 1,2,3,7,8,9-HxCDD            | 0.1            | NotFnd          | <1.0         | 1.0        | U          |      | 50       |
| 1,2,3,4,6,7,8-HpCDD          | 0.01           | 35.31           | 12.0         | 3.1        | J          |      | 50       |
| OCDD                         | 0.0003         | 36.77           | 68.0         | 5.7        | J,B        |      | 100      |
| 2,3,7,8-TCDF                 | 0.1            | NotFnd          | <0.93        | 0.93       | U          |      | 10       |
| 1,2,3,7,8-PeCDF              | 0.03           | NotFnd          | < 0.87       | 0.87       | U          |      | 50       |
| 2,3,4,7,8-PeCDF              | 0.3            | NotFnd          | < 0.70       | 0.70       | U          |      | 50       |
| 1,2,3,4,7,8-HxCDF            | 0.1            | NotFnd          | < 0.71       | 0.71       | U          |      | 50       |
|                              | 0.1            | 33.22           | < 0.81       | 0.66       | M,J,R      | 0.81 | 50       |
| 2,3,4,6,7,8-HxCDF            | 0.1            | 33.57           | <1.4         | 0.75       | M,J,R      |      | 50       |
| 1,2,3,7,8,9-HxCDF            | 0.1            | NotFnd          | <1.1         | 1.1        | U          |      | 50       |
| 1,2,3,4,6,7,8-HpCDF          | 0.01           | 34.76           | <4.7         | 1.6        | M,J,R      | 4.7  | 50       |
|                              |                |                 |              |            | И,5,M<br>U | 4.7  | 50       |
| 1,2,3,4,7,8,9-HpCDF<br>OCDF  | 0.01<br>0.0003 | NotFnd<br>36.83 | <2.7<br>11.0 | 2.7<br>5.4 | M,J,B      |      |          |
|                              | 0.0003         | 30.03           |              |            | ם,נ,ויו    |      | 100      |
| Extraction Standards         | pg             |                 | % Rec        |            |            |      |          |
| 13C12-2,3,7,8-TCDD           | 2000           | 26.81           | 66           | 25-164     |            |      |          |
| 13C12-1,2,3,7,8-PeCDD        | 2000           | 31.51           | 55           | 25-181     |            |      |          |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000           | 33.65           |              | 32-141     |            |      |          |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000           | 33.71           |              | 28-130     |            |      |          |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000           | 35.31           |              | 23-140     |            |      |          |
| 13C12-OCDD                   | 4000           | 36.76           | 41           | 17-157     |            |      |          |
| 13C12-2,3,7,8-TCDF           | 2000           | 25.89           | 64           | 24-169     |            |      |          |
| 13C12-1,2,3,7,8-PeCDF        | 2000           | 30.48           |              | 24-169     |            |      |          |
| 13C12-1,2,3,7,8-PeCDF        | 2000           | 31.28           |              | 21-178     |            |      |          |
| 13C12-1,2,3,4,7,8-PeCDF      | 2000           | 33.15           |              | 26-152     |            |      |          |
| 13C12-1,2,3,4,7,8-HXCDF      | 2000           | 33.15           |              | 26-152     |            |      |          |
| 13C12-1,2,3,6,7,8-HXCDF      | 2000           | 33.22           |              | 28-123     |            |      |          |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000           | 33.98           |              | 29-147     |            |      |          |
| 13C12-1,2,3,4,6,7,8-HpCDF    | 2000           | 34.75           |              | 28-147     |            |      |          |
| 13C12-1,2,3,4,6,7,8-HPCDF    | 2000           | 34.75<br>35.54  |              | 26-143     |            |      |          |
|                              |                | 33.34           | US           | 20-130     |            |      |          |
| Cleanup Standard             | pg             |                 |              |            |            |      |          |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40             | 26.82           | 53           | 35-197     |            |      |          |
|                              |                |                 | Conc.        | EDL        |            |      |          |
| Homologue Group Totals       |                | # peaks         | pg           | pg         |            |      |          |
| Total-TCDD                   |                | 0.00            | <1.1         | 1.1        | U          |      | 10       |
| Total-PeCDD                  |                | 0.00            | <1.0         | 1.0        | U          |      | 50       |
| Total-HxCDD                  |                | 0.00            | <1.1         | 1.1        | U          |      | 50       |
| Total-HpCDD                  |                | 2.00            | 25.2         | 3.1        | Ū          |      | 50       |
| Total-TCDF                   |                | 0.00            | < 0.93       | 0.93       | U          |      | 10       |
|                              |                |                 |              |            |            |      |          |
| Total-PeCDF                  |                | 0.00            | < 0.87       | 0.87       | U          |      | 50       |
| Total-HxCDF<br>Total-HpCDF   |                | 2.00<br>0.00    | 4.32<br><2.7 | 1.1<br>2.7 | U          |      | 50<br>50 |
| тотат-преог                  |                | 0.00            | \2.7         | 2.7        | 0          |      | 30       |
| Toxic Equivalency - (WHO     | 2005)          |                 | pg           |            |            |      |          |
| Lower Bound PCDD/F TEQ (     |                |                 | 0.144        |            |            |      |          |
| Mid Point PCDD/F TEQ (V      |                |                 | 1.89         |            |            |      |          |

Mid Point PCDD/F TEQ (WHO 2005)
Upper Bound PCDD/F TEQ (WHO 2005) 1.89 3.36

> Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency М Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

Indicates that a target analyte was detected below the calibrated range. R  $Indicates \ that \ the \ ion \ abundance \ ratio \ for \ this \ compound \ did \ not \ meet \ the \ acceptance \ criterion.$ В

Indicates that this target was detected in the blank at greater than 10% of the sample concentration. LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

Sample Name ENG-583-DFP-02 L2526958-7 ALS Sample ID Analysis Method Analysis Type

Sample Matrix

Extraction Date Sample Size Percent Moisture Split Ratio Swab

Sampling Date 4-Nov-20 25-Nov-20 1 n/a

2

Approved: *T.Patterson* --e-signature--21-Dec-2020

Run Information Run 1 10-201218A14 Filename

18-Dec-20 23:24 Run Date 10 uL Final Volume Dilution Factor 1 Analysis Units pg

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | TEF        | Ret.    | Conc.        | EDL    |       | EMPC |     |
|------------------------------|------------|---------|--------------|--------|-------|------|-----|
| Target Analytes              | (WHO 2005) | Time    | pg           |        | Flags | pg   | LQL |
|                              |            |         |              |        |       |      |     |
| 2,3,7,8-TCDD                 | 1          | NotFnd  | <1.1         | 1.1    | U     |      | 10  |
|                              | 1          | NotFnd  | <0.87        | 0.87   | U     |      | 50  |
| 1,2,3,4,7,8-HxCDD            | 0.1        | NotFnd  | <1.5         | 1.5    | U     |      | 50  |
| 1,2,3,6,7,8-HxCDD            | 0.1        | NotFnd  | <1.3         | 1.3    | U     |      | 50  |
| 1,2,3,7,8,9-HxCDD            | 0.1        | NotFnd  | <1.3         | 1.3    | U     |      | 50  |
| 1,2,3,4,6,7,8-HpCDD          | 0.01       | 35.30   | <6.9         | 2.5    | M,J,R | 6.9  | 50  |
| OCDD                         | 0.0003     | 36.74   | <30          | 3.9    | M,J,R | 30   | 100 |
| 2,3,7,8-TCDF                 | 0.1        | NotFnd  | < 0.95       | 0.95   | U     |      | 10  |
| 1,2,3,7,8-PeCDF              | 0.03       | NotFnd  | < 0.73       | 0.73   | U     |      | 50  |
| 2,3,4,7,8-PeCDF              | 0.3        | NotFnd  | < 0.60       | 0.60   | U     |      | 50  |
| 1,2,3,4,7,8-HxCDF            | 0.1        | NotFnd  | <0.73        | 0.73   | U     |      | 50  |
| 1,2,3,6,7,8-HxCDF            | 0.1        | 33.20   | <0.74        | 0.74   | M,U   |      | 50  |
|                              | 0.1        | NotFnd  | <0.74        | 0.78   | U     |      | 50  |
| 2,3,4,6,7,8-HxCDF            |            |         |              |        |       |      |     |
| 1,2,3,7,8,9-HxCDF            | 0.1        | NotFnd  | <1.3         | 1.3    | U     |      | 50  |
| 1,2,3,4,6,7,8-HpCDF          | 0.01       | 34.74   | 3.56         | 1.2    | М,Ј   |      | 50  |
| 1,2,3,4,7,8,9-HpCDF          | 0.01       | NotFnd  | <2.1         | 2.1    | U     |      | 50  |
| OCDF                         | 0.0003     | 36.82   | <5.3         | 4.2    | M,J,R | 5.3  | 100 |
| Extraction Standards         | pg         |         | % Rec        | Limits |       |      |     |
| 13C12-2,3,7,8-TCDD           | 2000       | 26.80   | 53           | 25-164 |       |      |     |
| 13C12-1,2,3,7,8-PeCDD        | 2000       | 31.50   | 51           | 25-181 |       |      |     |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000       | 33.64   | 59           | 32-141 |       |      |     |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000       | 33.70   | 72           | 28-130 |       |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000       | 35.29   |              | 23-140 |       |      |     |
| 13C12-OCDD                   | 4000       | 36.74   | 48           | 17-157 |       |      |     |
|                              |            |         |              |        |       |      |     |
| 13C12-2,3,7,8-TCDF           | 2000       | 25.88   |              | 24-169 |       |      |     |
| 13C12-1,2,3,7,8-PeCDF        | 2000       | 30.47   |              | 24-185 |       |      |     |
| 13C12-2,3,4,7,8-PeCDF        | 2000       | 31.27   |              | 21-178 |       |      |     |
| 13C12-1,2,3,4,7,8-HxCDF      | 2000       | 33.13   |              | 26-152 |       |      |     |
| 13C12-1,2,3,6,7,8-HxCDF      | 2000       | 33.20   |              | 26-123 |       |      |     |
| 13C12-2,3,4,6,7,8-HxCDF      | 2000       | 33.55   |              | 28-136 |       |      |     |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000       | 33.96   |              | 29-147 |       |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDF    | 2000       | 34.74   |              | 28-143 |       |      |     |
| 13C12-1,2,3,4,7,8,9-HpCDF    | 2000       | 35.53   | 60           | 26-138 |       |      |     |
| Cleanup Standard             | pg         |         |              |        |       |      |     |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40         | 26.81   | 40           | 35-197 |       |      |     |
|                              |            |         | Conc.        | EDL    |       |      |     |
| Homologue Group Totals       |            | # peaks | pg           | pg     |       |      |     |
|                              |            |         |              |        |       |      |     |
| Total-TCDD                   |            | 0.00    | <1.1         | 1.1    | U     |      | 10  |
| Total-PeCDD                  |            | 0.00    | <0.87        | 0.87   | U     |      | 50  |
| Total-HxCDD                  |            | 0.00    | <1.5         | 1.5    | U     |      | 50  |
| Total-HpCDD                  |            | 0.00    | <2.5         | 2.5    | U     |      | 50  |
| Total-TCDF                   |            | 0.00    | < 0.95       | 0.95   | U     |      | 10  |
| Total-PeCDF                  |            | 0.00    | < 0.73       | 0.73   | U     |      | 50  |
| Total-HxCDF                  |            | 0.00    | <1.3         | 1.3    | U     |      | 50  |
| Total-HpCDF                  |            | 1.00    | 3.56         | 2.1    |       |      | 50  |
| Toxic Equivalency - (WHO     | 2005)      |         | pg           |        |       |      |     |
|                              |            |         |              |        |       |      |     |
| Lower Bound PCDD/F TEQ (     |            |         | 0.0356       |        |       |      |     |
| Mid Point PCDD/F TEQ (WHO    |            |         | 1.64<br>3.17 |        |       |      |     |
| .,,                          |            |         |              |        |       |      |     |

Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency М Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

Indicates that a target analyte was detected below the calibrated range.

R  $Indicates \ that \ the \ ion \ abundance \ ratio \ for \ this \ compound \ did \ not \ meet \ the \ acceptance \ criterion.$ 

LQL  $Lower\ Quantification\ Limit,\ based\ on\ the\ lowest\ calibration\ level\ corrected\ for\ sample\ size,\ splits\ and\ dilutions.$ EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### Sample Analysis Report

 Sample Name
 ENG-168-DFP-01

 ALS Sample ID
 L2526958-8

 Analysis Method
 EPA 1613B

 Analysis Type
 Sample

Lower Bound PCDD/F TEQ (WHO 2005)

Mid Point PCDD/F TEQ (WHO 2005) Upper Bound PCDD/F TEQ (WHO 2005)

Sample Matrix

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1
Percent Moisture n/a
Split Ratio 2

Approved: *T.Patterson* --e-signature--21-Dec-2020

Run Information Run 1
Filename 10-2012

 Filename
 10-201218A15

 Run Date
 19-Dec-20 00:06

 Final Volume
 10 uL

 Dilution Factor
 1

 Analysis Units
 pg

Swab

Instrument - Column HRMS-10 DB5MSUSO287833H

| TEE        | Po+                                                                                                                           | Conc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 1          | NotFnd                                                                                                                        | <1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 1          | NotFnd                                                                                                                        | <1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 0.1        | NotFnd                                                                                                                        | <1.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 0.1        | NotFnd                                                                                                                        | <1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 0.1        | NotFnd                                                                                                                        | <1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 0.1        | NotFnd                                                                                                                        | < 0.79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| 0.1        | 33.22                                                                                                                         | < 0.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| 0.1        | NotFnd                                                                                                                        | < 0.83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| 0.01       | 34.75                                                                                                                         | <3.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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|            | 1 1 1 0.1 0.1 0.1 0.1 0.0003 0.1 0.003 0.3 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.01 0.0003  P9 2000 2000 2000 2000 2000 2000 2000 | (WHO 2005)         Time           1         NotFnd           0.1         NotFnd           0.1         NotFnd           0.01         35.30           0.0003         NotFnd           0.3         NotFnd           0.3         NotFnd           0.1         NotFnd           0.1         NotFnd           0.1         NotFnd           0.1         NotFnd           0.1         NotFnd           0.1         NotFnd           0.01         34.75           0.01         NotFnd           0.01         36.84           Pg         2000         26.80           2000         31.50           2000         33.64           2000         33.64           2000         35.30           4000         36.74           2000         35.30           4000         30.47           2000         33.51           2000         33.51           2000         33.55           2000         35.53           2000         35.53           2000         35.53           2000 | (WHO 2005)         Time         pg           1         NotFnd         <1.2 | (WHO 2005)         Time         pg         pg | (WHO 2005)         Time         pg         Figs         Ps         Image: ps         Ps | NotFind   NotFind   California   NotFind   California   California |

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.

TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency

M Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

Indicates that a target analyte was detected below the calibrated range.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

B Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

0.0204

2.11 4.02

#### Sample Analysis Report

Sample Name DFP-BLANK
ALS Sample ID L2526958-9
Analysis Method EPA 1613B
Analysis Type Sample
Sample Matrix Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1
Percent Moisture n/a
Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

Run Information Run 1

U

LQL EMPC

 Filename
 10-201218A16

 Run Date
 19-Dec-20 00:49

 Final Volume
 10 uL

 Dilution Factor
 1

 Analysis Units
 pg

Instrument - Column HRMS-10 DB5MSUSO287833H

|                                             | TEF          | Ret.           | Conc.     | EDL              |       | МРС            |
|---------------------------------------------|--------------|----------------|-----------|------------------|-------|----------------|
| Target Analytes                             | (WHO 2005)   |                |           |                  |       |                |
|                                             |              |                | pg        | pg Flags         |       |                |
|                                             | 1            | NotFnd         | <1.2      | 1.2              | U     | 10             |
| 1,2,3,7,8-PeCDD                             | 1            | NotFnd         | <0.82     | 0.82             | U     | 50             |
| 1,2,3,4,7,8-HxCDD                           | 0.1          | NotFnd         | <1.0      | 1.0              | U     | 50             |
| 1,2,3,6,7,8-HxCDD                           | 0.1          | NotFnd         | < 0.92    | 0.92             | U     | 50             |
| 1,2,3,7,8,9-HxCDD                           | 0.1          | NotFnd         | <0.92     | 0.92             | U     | 50             |
| 1,2,3,4,6,7,8-HpCDD                         | 0.01         | NotFnd         | <2.2      | 2.2              | U     | 50             |
| 1,2,3,4,6,7,6-HPCDD<br>OCDD                 | 0.003        | NotFind        | <4.1      | 4.1              | U     | 100            |
| OCDD                                        | 0.0003       | INOLFILA       | <4.1      | 4.1              | U     | 100            |
| 2,3,7,8-TCDF                                | 0.1          | NotFnd         | < 0.90    | 0.90             | U     | 10             |
| 1,2,3,7,8-PeCDF                             | 0.03         | NotFnd         | < 0.79    | 0.79             | U     | 50             |
| 2,3,4,7,8-PeCDF                             | 0.3          | NotFnd         | < 0.59    | 0.59             | U     | 50             |
| 1,2,3,4,7,8-HxCDF                           | 0.1          | NotFnd         | < 0.62    | 0.62             | U     | 50             |
|                                             | 0.1          | NotFnd         | < 0.60    | 0.60             | U     | 50             |
| 1,2,3,6,7,8-HxCDF                           |              |                |           |                  |       |                |
| 2,3,4,6,7,8-HxCDF                           | 0.1          | NotFnd         | < 0.64    | 0.64             | U     | 50             |
| 1,2,3,7,8,9-HxCDF                           | 0.1          | NotFnd         | <0.96     | 0.96             | U     | 50             |
| 1,2,3,4,6,7,8-HpCDF                         | 0.01         | NotFnd         | <1.5      | 1.5              | U     | 50             |
| 1,2,3,4,7,8,9-HpCDF                         | 0.01         | NotFnd         | <2.3      | 2.3              | U     | 50             |
| OCDF                                        | 0.0003       | NotFnd         | < 5.0     | 5.0              | U     | 100            |
| Extraction Standards                        | pg           |                | % Rec     | Limits           |       |                |
| 10010 0 0 7 0 7000                          | 2000         | 25.01          |           | 0= 464           |       |                |
| 13C12-2,3,7,8-TCDD<br>13C12-1,2,3,7,8-PeCDD | 2000<br>2000 | 26.81<br>31.51 |           | 25-164<br>25-181 |       |                |
| 13C12-1,2,3,4,7,8-PeCDD                     | 2000         | 33.65          |           | 32-141           |       |                |
|                                             |              |                |           |                  |       |                |
| 13C12-1,2,3,6,7,8-HxCDD                     | 2000         | 33.71          |           | 28-130           |       |                |
| 13C12-1,2,3,4,6,7,8-HpCDD                   | 2000         | 35.31          |           | 23-140           |       |                |
| 13C12-OCDD                                  | 4000         | 36.76          | 42        | 17-157           |       |                |
| 13C12-2,3,7,8-TCDF                          | 2000         | 25.89          | 54        | 24-169           |       |                |
| 13C12-1,2,3,7,8-PeCDF                       | 2000         | 30.49          |           | 24-185           |       |                |
| 13C12-2,3,4,7,8-PeCDF                       | 2000         | 31.28          |           | 21-178           |       |                |
| 13C12-1,2,3,4,7,8-HxCDF                     | 2000         | 33.15          |           | 26-152           |       |                |
| 13C12-1,2,3,6,7,8-HxCDF                     | 2000         | 33.22          |           | 26-132           |       |                |
|                                             |              |                |           | 28-123           |       |                |
| 13C12-2,3,4,6,7,8-HxCDF                     | 2000         | 33.56<br>33.98 |           |                  |       |                |
| 13C12-1,2,3,7,8,9-HxCDF                     | 2000         |                |           | 29-147           |       |                |
| 13C12-1,2,3,4,6,7,8-HpCDF                   | 2000         | 34.75          |           | 28-143           |       |                |
| 13C12-1,2,3,4,7,8,9-HpCDF                   | 2000         | 35.54          | 57        | 26-138           |       |                |
| Cleanup Standard                            | pg           |                |           |                  |       |                |
|                                             |              |                |           |                  |       |                |
| 37Cl4-2,3,7,8-TCDD (Cleanup)                | 40           | 26.82          | 43        | 35-197           |       |                |
|                                             |              |                | Conc.     | EDL              |       |                |
| Homologue Group Totals                      |              | # peaks        |           |                  |       |                |
| Homologue Group Totals                      |              | # peaks        | pg        | pg               |       |                |
| Total-TCDD                                  |              | 0.00           | <1.2      | 1.2              | U     | 10             |
| Total-PeCDD                                 |              | 0.00           | < 0.82    | 0.82             | U     | 50             |
| Total-HxCDD                                 |              | 0.00           | <1.0      | 1.0              | U     | 50             |
| Total-HpCDD                                 |              | 0.00           | <2.2      | 2.2              | U     | 50             |
| Total-TCDF                                  |              | 0.00           | <0.90     | 0.90             | U     | 10             |
| Total-PeCDF                                 |              | 0.00           | <0.79     | 0.79             | U     | 50             |
|                                             |              |                |           |                  |       |                |
| Total-HxCDF                                 |              | 0.00           | < 0.96    | 0.96             | U     | 50             |
| Total-HpCDF                                 |              | 0.00           | <2.3      | 2.3              | U     | 50             |
| Toxic Equivalency - (WHO                    | 2005)        |                | pg        |                  |       |                |
| Lower Bound PCDD/F TEQ (                    | WHO 2005)    |                | 0.00      |                  |       |                |
| Mid Point PCDD/F TEQ (WH                    | O 2005)      |                | 1.47      |                  |       |                |
| Upper Bound PCDD/F TEQ (                    | WHO 2005)    |                | 2.94      |                  |       |                |
|                                             |              |                |           |                  |       |                |
| EDL                                         |              |                |           | ated Detection   |       | , based on the |
| TEF                                         |              | Indicates      | the Toxic | Equivalency Fa   | actor |                |

Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that this compound was not detected above the EDL.

#### Sample Analysis Report

Sample Name ENG-159-DFP-1
ALS Sample ID L2526958-10
Analysis Method EPA 1613B
Analysis Type Sample
Sample Matrix Swab

Run 1 10-201218A22

**Run Information** 

Filename

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Extraction Date
Sample Size
Percent Moisture
Split Ratio

1 Sw n/a

2

Approved: T.Patterson --e-signature--21-Dec-2020

19-Dec-20 05:09 Run Date 10 Final Volume uL Dilution Factor 1 Analysis Units pg Instrument - Column HRMS-10 DB5MSUSO287833H TFF Ret. Conc. EDL EMPC (WHO 2005) Target Analytes Time LOL pg pg Flags рa 2,3,7,8-TCDD NotFnd <1.4 1.4 п 10 1,2,3,7,8-PeCDD NotFnd <1.3 1.3 U 50 1,2,3,4,7,8-HxCDD 0.1 NotFnd <1.4 1.4 U 50 1,2,3,6,7,8-HxCDD 0.1 NotFnd <1.2 1.2 U 50 1,2,3,7,8,9-HxCDD 0.1 NotFnd <1.2 1.2 U 50 1,2,3,4,6,7,8-HpCDD 0.01 35 31 <93 5.1 M,J,R 9.3 50 OCDD 0.0003 36.75 93.8 15 M,J 100 2,3,7,8-TCDF 0.1 NotFnd <1.1 1.1 U 10 1,2,3,7,8-PeCDF 0.03 NotFnd <0.96 0.96 U 50 2,3,4,7,8-PeCDF NotFnd <0.76 0.76 1,2,3,4,7,8-HxCDF 0.1 NotFnd <1.0 1.0 U 50 1,2,3,6,7,8-HxCDF 33.24 0.91 50 0.1 1.48 M,J,B 2,3,4,6,7,8-HxCDF 0.1 NotFnd <1.0 1.0 U 50 1,2,3,7,8,9-HxCDF 0.1 NotFnd <1.6 1.6 U 50 1,2,3,4,6,7,8-HpCDF 0.01 34.76 5.17 2.8 M,J 50 1,2,3,4,7,8,9-HpCDF 0.01 NotEnd < 5.2 5.2 U 50 OCDF 0.0003 36.85 17.1 12 M,J,B 100 **Extraction Standards** % Rec Limits рg 13C12-2,3,7,8-TCDD 2000 54 25-164 26.80 13C12-1,2,3,7,8-PeCDD 31.50 44 25-181 13C12-1,2,3,4,7,8-HxCDD 2000 33.65 60 32-141 13C12-1,2,3,6,7,8-HxCDD 2000 33.71 67 28-130 13C12-1,2,3,4,6,7,8-HpCDD 2000 35.30 47 23-140 13C12-OCDD 4000 28 17-157 36.77 13C12-2,3,7,8-TCDF 25.88 52 24-169 2000 45 24-185 13C12-1,2,3,7,8-PeCDF 2000 30.48 13C12-2,3,4,7,8-PeCDF 31.27 45 21-178 13C12-1,2,3,4,7,8-HxCDF 33.13 67 26-152 2000 13C12-1,2,3,6,7,8-HxCDF 2000 33.21 74 26-123 13C12-2.3.4.6.7.8-HxCDF 2000 33.55 72 28-136 13C12-1,2,3,7,8,9-HxCDF 2000 33.97 62 29-147 13C12-1,2,3,4,6,7,8-HpCDF 2000 34.75 54 28-143 13C12-1,2,3,4,7,8,9-HpCDF 2000 35.53 47 26-138 Cleanup Standard pg 37Cl4-2,3,7,8-TCDD (Cleanup) 40 26.82 45 35-197 EDL Conc. **Homologue Group Totals** рg рg Total-TCDD 0.00 <1.4 1.4 U 10 Total-PeCDD 50 0.00 <1.3 1.3 U 50 Total-HxCDD 1.00 2.94 1.4 Total-HpCDD 50 0.00 U < 5.1 5.1 Total-TCDF 0.00 10 <1.1 1.1 U Total-PeCDF 50 0.00 < 0.96 0.96 U Total-HxCDF 50 2.00 3.13 1.6 Total-HpCDF 2.00 8.17 5.2 Toxic Equivalency - (WHO 2005) рg Lower Bound PCDD/F TEQ (WHO 2005) 0.233 Mid Point PCDD/F TEQ (WHO 2005) Upper Bound PCDD/F TEQ (WHO 2005) 2.26 4.18 Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency TEQ Μ Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that a target analyte was detected below the calibrated range. R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion. В Indicates that this target was detected in the blank at greater than 10% of the sample concentration. LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### **Sample Analysis Report**

Sample Name ALS Sample ID Analysis Method Analysis Type ENG-583-DFP-01 L2526958-11 EPA 1613B Sample Sample Matrix Swab

Run 1

Run Information

Sampling Date Extraction Date Sample Size Percent Moisture 4-Nov-20 25-Nov-20 1 n/a

Split Ratio

Swab

Approved: T.Patterson --e-signature--21-Dec-2020

| Run Information                        |              | Run 1                    |                             |                       |                        |                      |                        |                                                                                                                 |
|----------------------------------------|--------------|--------------------------|-----------------------------|-----------------------|------------------------|----------------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
| Filename                               |              | 10-201218                | 3A23                        |                       |                        |                      |                        |                                                                                                                 |
| Run Date                               |              | 19-Dec-20                |                             |                       |                        |                      |                        |                                                                                                                 |
| Final Volume                           |              |                          | JL                          |                       |                        |                      |                        |                                                                                                                 |
| Dilution Factor                        |              | 1                        |                             |                       |                        |                      |                        |                                                                                                                 |
|                                        |              |                          |                             |                       |                        |                      |                        |                                                                                                                 |
| Analysis Units                         |              | pg                       | DEMCHE                      | 007000                |                        |                      |                        |                                                                                                                 |
| Instrument - Column                    |              | HRMS-10 [                | DROMSOS                     | J28/833               | н                      |                      |                        |                                                                                                                 |
|                                        |              |                          |                             |                       |                        |                      |                        |                                                                                                                 |
|                                        | TEF          | Ret.                     | Conc.                       | EDL                   |                        | <b>EMPC</b>          |                        |                                                                                                                 |
| Target Analytes                        | (WHO 2005    | ) Time                   | pg                          | pg                    | Flags                  | pg                   | LQL                    |                                                                                                                 |
| 2 2 7 0 7000                           |              | N. IF. I                 |                             |                       |                        |                      |                        |                                                                                                                 |
| 2,3,7,8-TCDD<br>1,2,3,7,8-PeCDD        |              | NotFnd                   | <1.6                        | 1.6                   | U                      |                      | 10<br>50               |                                                                                                                 |
|                                        |              | NotFnd                   | <1.6                        | 1.6<br>1.7            | U                      |                      | 50                     |                                                                                                                 |
| 1,2,3,4,7,8-HxCDD                      |              | NotFnd<br>NotFnd         | <1.7<br><1.6                | 1.6                   | U                      |                      | 50                     |                                                                                                                 |
| 1,2,3,6,7,8-HxCDD<br>1,2,3,7,8,9-HxCDD |              | 33.86                    | <1.8                        | 1.6                   | M,J,R                  |                      | 50                     |                                                                                                                 |
| 1,2,3,4,6,7,8-HpCDD                    |              | 35.33                    | <24                         | 5.1                   | M,J,R                  |                      | 50                     |                                                                                                                 |
| OCDD                                   |              | 36.76                    | 184                         | 8.7                   | M                      |                      | 100                    |                                                                                                                 |
| OCDD                                   | 0.0005       | 30.70                    | 104                         | 0.7                   |                        |                      | 100                    |                                                                                                                 |
| 2,3,7,8-TCDF                           |              | NotFnd                   | <1.5                        | 1.5                   | U                      |                      | 10                     |                                                                                                                 |
| 1,2,3,7,8-PeCDF                        | 0.03         | NotFnd                   | <1.4                        | 1.4                   | U                      |                      | 50                     |                                                                                                                 |
| 2,3,4,7,8-PeCDF                        |              | NotFnd                   | <1.1                        | 1.1                   | U                      |                      | 50                     |                                                                                                                 |
| 1,2,3,4,7,8-HxCDF                      |              | NotFnd                   | <1.7                        | 1.7                   | U                      |                      | 50                     |                                                                                                                 |
| 1,2,3,6,7,8-HxCDF                      |              | 33.23                    | 2.00                        | 1.6                   | M,J,B                  |                      | 50                     |                                                                                                                 |
| 2,3,4,6,7,8-HxCDF                      |              | NotFnd                   | <1.8                        | 1.8                   | U                      |                      | 50                     |                                                                                                                 |
| 1,2,3,7,8,9-HxCDF                      |              | NotFnd                   | <2.8                        | 2.8                   | U                      |                      | 50                     |                                                                                                                 |
| 1,2,3,4,6,7,8-HpCDF                    |              | 34.76                    | 15.8                        | 3.5                   | М,Ј                    |                      | 50                     |                                                                                                                 |
| 1,2,3,4,7,8,9-HpCDF                    |              | NotFnd                   | < 5.4                       | 5.4                   | U                      |                      | 50                     |                                                                                                                 |
| OCDF                                   | 0.0003       | 36.84                    | <21                         | 7.6                   | M,J,R                  | 21                   | 100                    |                                                                                                                 |
| Extraction Standards                   | pg           |                          | % Rec                       | Limits                |                        |                      |                        |                                                                                                                 |
| 13C12-2,3,7,8-TCDD                     | 2000         | 26.81                    | 47                          | 25-164                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,7,8-PeCDD                  | 2000         | 31.51                    |                             | 25-181                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,4,7,8-HxCDD                | 2000         | 33.65                    | 56                          | 32-141                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,6,7,8-HxCDD                | 2000         | 33.71                    | 59                          | 28-130                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,4,6,7,8-HpCDD              | 2000         | 35.31                    |                             | 23-140                |                        |                      |                        |                                                                                                                 |
| 13C12-OCDD                             | 4000         | 36.76                    | 42                          | 17-157                |                        |                      |                        |                                                                                                                 |
| 13C12-2,3,7,8-TCDF                     | 2000         | 25.89                    | 50                          | 24-169                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,7,8-PeCDF                  |              | 30.49                    |                             | 24-185                |                        |                      |                        |                                                                                                                 |
| 13C12-2,3,4,7,8-PeCDF                  | 2000         | 31.28                    | 40                          | 21-178                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,4,7,8-HxCDF                | 2000         | 33.15                    | 61                          | 26-152                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,6,7,8-HxCDF                | 2000         | 33.22                    |                             | 26-123                |                        |                      |                        |                                                                                                                 |
| 13C12-2,3,4,6,7,8-HxCDF                |              | 33.56                    |                             | 28-136                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,7,8,9-HxCDF                | 2000         | 33.98                    |                             | 29-147                |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,4,6,7,8-HpCDF              | 2000<br>2000 | 34.76<br>35.54           |                             | 28-143<br>26-138      |                        |                      |                        |                                                                                                                 |
| 13C12-1,2,3,4,7,8,9-HpCDF              | 2000         | 33.34                    | 32                          | 20-136                |                        |                      |                        |                                                                                                                 |
| Cleanup Standard                       | pg           |                          |                             |                       |                        |                      |                        |                                                                                                                 |
| 37Cl4-2,3,7,8-TCDD (Cleanup)           | 40           | 26.82                    | 39                          | 35-197                |                        |                      |                        |                                                                                                                 |
|                                        |              |                          | Conc.                       | EDL                   |                        |                      |                        |                                                                                                                 |
| Homologue Group Totals                 |              | # peaks                  | pg                          | pg                    |                        |                      |                        |                                                                                                                 |
|                                        |              |                          |                             |                       |                        |                      | 10                     |                                                                                                                 |
| Total-TCDD<br>Total-PeCDD              |              | 2.00                     | 28.0                        | 1.6                   |                        |                      | 10                     |                                                                                                                 |
| Total-HxCDD                            |              | 1.00                     | 4.90                        | 1.6                   |                        |                      | 50<br>50               |                                                                                                                 |
| Total-HpCDD                            |              | 1.00<br>1.00             | 3.82<br>35.5                | 1.7<br>5.1            |                        |                      | 50<br>50               |                                                                                                                 |
| Total-TCDF                             |              | 0.00                     | <1.5                        | 1.5                   | U                      |                      | 10                     |                                                                                                                 |
| Total-PeCDF                            |              | 0.00                     | <1.4                        | 1.4                   | 11                     |                      | 50                     |                                                                                                                 |
| Total-HxCDF                            |              | 3.00                     | 6.15                        | 2.8                   | U                      |                      | 50                     |                                                                                                                 |
| Total-HpCDF                            |              | 1.00                     | 15.8                        | 5.4                   |                        |                      | 50                     |                                                                                                                 |
| •                                      |              |                          |                             |                       |                        |                      |                        |                                                                                                                 |
| Toxic Equivalency - (WHO               | 2005)        |                          | pg                          |                       |                        |                      |                        |                                                                                                                 |
| Lower Bound PCDD/F TEQ                 | (WHO 2005)   |                          | 0.413                       |                       |                        |                      |                        |                                                                                                                 |
| Mid Point PCDD/F TEQ (WH               |              |                          | 3.21                        |                       |                        |                      |                        |                                                                                                                 |
| Upper Bound PCDD/F TEQ                 | (WHO 2005)   |                          | 5.58                        |                       |                        |                      |                        |                                                                                                                 |
| EDL                                    |              | Indicates t              | he Estima                   | ted Dete              | ction Lim              | nit, based           | on the                 | measured background noise for this target in this sample.                                                       |
| TEF                                    |              | Indicates t              |                             |                       |                        |                      |                        | TEQ Indicates the Toxic Equivalency                                                                             |
| М                                      |              | Indicates t              |                             |                       |                        |                      |                        |                                                                                                                 |
| U                                      |              | Indicates t              | hat this co                 | ompound               | l was not              | detecte              | d above                | the EDL.                                                                                                        |
|                                        |              |                          |                             |                       |                        |                      |                        |                                                                                                                 |
| J                                      |              | Indicates t              | hat a targ                  |                       |                        |                      |                        | calibrated range.                                                                                               |
|                                        |              |                          |                             |                       |                        |                      |                        |                                                                                                                 |
| R                                      |              |                          |                             |                       |                        |                      |                        | nd did not meet the acceptance criterion.                                                                       |
| В                                      |              | Indicates t              | hat this ta                 | arget was             | s detecte              | d in the             | blank at               | greater than 10% of the sample concentration.                                                                   |
| B<br>LQL                               |              | Indicates t<br>Lower Qua | hat this ta<br>Intification | arget was<br>Limit, b | s detecte<br>ased on 1 | d in the<br>the lowe | blank at<br>st calibra | greater than $10\%$ of the sample concentration.<br>tion level corrected for sample size, splits and dilutions. |
| В                                      |              | Indicates t<br>Lower Qua | hat this ta<br>Intification | arget was<br>Limit, b | s detecte<br>ased on 1 | d in the<br>the lowe | blank at<br>st calibra | greater than 10% of the sample concentration.                                                                   |

#### Sample Analysis Report

 Sample Name
 ENG-558-DFP-01

 ALS Sample ID
 L2526958-12

 Analysis Method
 EPA 16138

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1
Percent Moisture n/a
Split Ratio 2

Approved: T.Patterson --e-signature--21-Dec-2020

> R B

LQL EMPC

Instrument - Column HRMS-10 DB5MSUSO287833H

|                                                    | TEF          | Ret.             | Conc.          | EDL              |          | ЕМРС     |          |
|----------------------------------------------------|--------------|------------------|----------------|------------------|----------|----------|----------|
| Target Analytes                                    | (WHO 2005)   |                  | pg             |                  | Flags    | рд       | LQL      |
|                                                    |              |                  |                |                  |          | ÞУ       |          |
| 2,3,7,8-TCDD                                       |              | NotFnd           | <1.1           | 1.1              | U        |          | 10       |
|                                                    | 1<br>0.1     | NotFnd<br>NotFnd | <1.2<br><1.4   | 1.2<br>1.4       | U        |          | 50<br>50 |
| 1,2,3,4,7,8-HxCDD<br>1,2,3,6,7,8-HxCDD             | 0.1          | 33.72            | <1.4<br><1.5   | 1.4              | M,J,R    | 1 6      | 50       |
| 1,2,3,6,7,8-HXCDD<br>1,2,3,7,8,9-HxCDD             | 0.1          | 33.85            | <1.6           | 1.3              | M,J,R    | 1.6      | 50       |
| 1,2,3,4,6,7,8-HpCDD                                | 0.01         | 35.32            | 18.1           | 2.5              | M,J      | 1.0      | 50       |
| 1,2,3,4,0,7,6-11PCDD<br>OCDD                       | 0.0003       | 36.77            | 135            | 10               | M        |          | 10       |
|                                                    |              |                  |                |                  |          |          |          |
|                                                    | 0.1          | NotFnd           | < 0.85         | 0.85             | U        |          | 1        |
|                                                    | 0.03         | NotFnd           | <1.1           | 1.1              | U        |          | 5        |
| 2,3,4,7,8-PeCDF                                    | 0.3          | NotFnd           | < 0.87         | 0.87             | U        |          |          |
| 1,2,3,4,7,8-HxCDF                                  | 0.1<br>0.1   | NotFnd<br>NotFnd | <0.96<br><0.82 | 0.96<br>0.82     | U        |          | 5        |
| 1,2,3,6,7,8-HxCDF<br>2,3,4,6,7,8-HxCDF             | 0.1          | NotFnd           | < 0.88         | 0.82             | U        |          |          |
| 1,2,3,7,8,9-HxCDF                                  | 0.1          | 33.97            | <1.3           | 1.3              | M,U      | 1.2      |          |
| 1,2,3,4,6,7,8-HpCDF                                | 0.01         | 34.76            | 11.0           | 3.7              | M,J      | 1.2      |          |
| 1,2,3,4,7,8,9-HpCDF                                | 0.01         | NotFnd           | <6.5           | 6.5              | U        |          |          |
| OCDF                                               | 0.0003       | 36.86            | 14.1           | 7.5              | M,J,B    |          |          |
| Extraction Standards                               | pg           |                  | % Rec          | Limits           |          |          |          |
| 13C12-2,3,7,8-TCDD                                 | 2000         | 26.81            |                | 25-164           |          |          |          |
| 13C12-1,2,3,7,8-PeCDD                              | 2000         | 31.51            |                | 25-181           |          |          |          |
| 13C12-1,2,3,4,7,8-HxCDD                            | 2000         | 33.65            |                | 32-141           |          |          |          |
| 13C12-1,2,3,6,7,8-HxCDD                            | 2000         | 33.71            |                | 28-130           |          |          |          |
| 13C12-1,2,3,4,6,7,8-HpCDD                          | 2000         | 35.31            |                | 23-140           |          |          |          |
| 13C12-OCDD                                         | 4000         | 36.77            | 34             | 17-157           |          |          |          |
| 13C12-2,3,7,8-TCDF                                 | 2000         | 25.89            | 55             | 24-169           |          |          |          |
| 13C12-1,2,3,7,8-PeCDF                              | 2000         | 30.48            | 46             | 24-185           |          |          |          |
| 13C12-2,3,4,7,8-PeCDF                              | 2000         | 31.28            |                | 21-178           |          |          |          |
| 13C12-1,2,3,4,7,8-HxCDF                            | 2000         | 33.15            |                | 26-152           |          |          |          |
| 13C12-1,2,3,6,7,8-HxCDF                            | 2000         | 33.22<br>33.56   |                | 26-123<br>28-136 |          |          |          |
| 13C12-2,3,4,6,7,8-HxCDF<br>13C12-1,2,3,7,8,9-HxCDF | 2000<br>2000 | 33.56            |                | 28-136           |          |          |          |
| 13C12-1,2,3,4,6,7,8-HpCDF                          | 2000         | 34.76            |                | 28-147           |          |          |          |
| 13C12-1,2,3,4,7,8,9-HpCDF                          | 2000         | 35.54            |                | 26-138           |          |          |          |
| Cleanup Standard                                   | pg           |                  |                |                  |          |          |          |
| 37Cl4-2,3,7,8-TCDD (Cleanup)                       | 40           | 26.82            | 47             | 35-197           |          |          |          |
|                                                    |              |                  | Conc.          | EDL              |          |          |          |
| Homologue Group Totals                             |              | # peaks          | pg             | pg               |          |          |          |
| Total-TCDD                                         |              | 0.00             | <1.1           | 1.1              | U        |          | 10       |
| Total-PeCDD                                        |              | 0.00             | <1.1           | 1.1              | U        |          | 50       |
| Total-HxCDD                                        |              | 0.00             | <1.4           | 1.4              | U        |          | 50       |
| Total-HpCDD                                        |              | 1.00             | 18.1           | 2.5              | Ü        |          | 50       |
| Total-TCDF                                         |              | 0.00             | < 0.85         | 0.85             | U        |          | 10       |
| Total-PeCDF                                        |              | 0.00             | <1.1           | 1.1              | Ü        |          | 50       |
| Total-HxCDF                                        |              | 2.00             | 4.28           | 1.3              |          |          | 50       |
| Total-HpCDF                                        |              | 1.00             | 11.0           | 6.5              |          |          | 50       |
| Toxic Equivalency - (WHO 2                         | 2005)        |                  | pg             |                  |          |          |          |
| Lower Bound PCDD/F TEQ (\                          |              |                  | 0.336          |                  |          |          |          |
| Mid Point PCDD/F TEQ (WHO                          | 2005)        |                  | 2.29           |                  |          |          |          |
| Upper Bound PCDD/F TEQ (V                          | WHU 2005)    |                  | 3.93           |                  |          |          |          |
| EDL                                                |              | Indicates t      |                |                  |          |          | on th    |
| TEF                                                |              | Indicates t      |                |                  |          |          |          |
| M                                                  |              | Indicates t      |                |                  |          |          |          |
| U                                                  |              | Indicates t      | nat this c     | ompound          | was not  | uetecte  | above    |
| J                                                  |              | Indicates t      | hat a targ     | get analyt       | e was de | tected b | low the  |

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

#### **Laboratory Method Blank Analysis Report**

Sample Name Method Blank
ALS Sample ID WG3440853-1
Analysis Method EPA 1613B
Analysis Type Blank
Sample Matrix QC

Lower Bound PCDD/F TEQ (WHO 2005)

Mid Point PCDD/F TEQ (WHO 2005) Upper Bound PCDD/F TEQ (WHO 2005)

М

U

R

LQL

EMPC

0.0917

1.96 3.83

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

Indicates that a target analyte was detected below the calibrated range.

Sampling Date n/a Extraction Date 25-Nov-20

Swab

Approved: *T.Patterson* --e-signature--21-Dec-2020

Run Information Run 1

 $\begin{array}{cccc} Filename & 10-201218A06 \\ Run \ Date & 18-Dec-20 \ 17:46 \\ Final \ Volume & 10 & uL \\ Dilution \ Factor & 1 \\ Analysis \ Units & pg & \\ \end{array}$ 

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | TEF        | Ret.    | Conc.  | EDL    |      | ЕМРС |     |
|------------------------------|------------|---------|--------|--------|------|------|-----|
| Target Analytes              | (WHO 2005) | Time    | pg     |        | lags | pg   | LQL |
|                              |            |         |        |        |      | P9   |     |
|                              | 1          | NotFnd  | <1.5   | 1.5    | U    |      | 10  |
| 1,2,3,7,8-PeCDD              | 1          | NotFnd  | <1.1   | 1.1    | U    |      | 50  |
| 1,2,3,4,7,8-HxCDD            | 0.1        | NotFnd  | <1.3   | 1.3    | U    |      | 50  |
| 1,2,3,6,7,8-HxCDD            | 0.1        | NotFnd  | <1.0   | 1.0    | U    |      | 50  |
| 1,2,3,7,8,9-HxCDD            | 0.1        | NotFnd  | <1.1   | 1.1    | U    |      | 50  |
| 1,2,3,4,6,7,8-HpCDD          | 0.01       | NotFnd  | <3.0   | 3.0    | U    |      | 50  |
| OCDD                         | 0.0003     | 36.75   | 6.88   | 5.5    | M,J  |      | 100 |
| 2,3,7,8-TCDF                 | 0.1        | NotFnd  | <1.4   | 1.4    | U    |      | 10  |
| 1,2,3,7,8-PeCDF              | 0.03       | NotFnd  | <1.1   | 1.1    | U    |      | 50  |
| 2,3,4,7,8-PeCDF              | 0.3        | NotFnd  | < 0.78 | 0.78   | U    |      | 50  |
| 1,2,3,4,7,8-HxCDF            | 0.1        | NotFnd  | < 0.87 | 0.87   | U    |      | 50  |
| 1,2,3,6,7,8-HxCDF            |            | 33.22   | 0.870  | 0.83   | M,J  |      | 50  |
| 2,3,4,6,7,8-HxCDF            | 0.1        | NotFnd  | < 0.94 | 0.94   | U    |      | 50  |
| 1,2,3,7,8,9-HxCDF            | 0.1        | 33.98   | <1.4   | 1.4    | M,U  | 1.1  | 50  |
|                              | 0.01       | NotFnd  |        | 1.4    | U.U  | 1.1  | 50  |
| 1,2,3,4,6,7,8-HpCDF          |            |         | <1.4   |        |      |      | 50  |
| 1,2,3,4,7,8,9-HpCDF          | 0.01       | NotFnd  | <2.3   | 2.3    | U    |      |     |
| OCDF                         | 0.0003     | 36.84   | 8.88   | 6.5    | M,J  |      | 100 |
| Extraction Standards         | pg         |         | % Rec  | Limits |      |      |     |
| 13C12-2,3,7,8-TCDD           | 2000       | 26.81   | 56     | 25-164 |      |      |     |
| 13C12-1,2,3,7,8-PeCDD        | 2000       | 31.51   | 52     | 25-181 |      |      |     |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000       | 33.65   | 58     | 32-141 | R    |      |     |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000       | 33.71   | 69     | 28-130 |      |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000       | 35.30   | 61     | 23-140 |      |      |     |
| 13C12-OCDD                   | 4000       | 36.76   | 48     | 17-157 |      |      |     |
| 13C12-2,3,7,8-TCDF           | 2000       | 25.89   | 58     | 24-169 |      |      |     |
| 13C12-1,2,3,7,8-PeCDF        | 2000       | 30.48   |        | 24-185 |      |      |     |
| 13C12-2,3,4,7,8-PeCDF        | 2000       | 31.28   |        | 21-178 |      |      |     |
| 13C12-1,2,3,4,7,8-HxCDF      | 2000       | 33.15   |        | 26-152 |      |      |     |
| 13C12-1,2,3,6,7,8-HxCDF      | 2000       | 33.22   |        | 26-123 |      |      |     |
| 13C12-2,3,4,6,7,8-HxCDF      | 2000       | 33.56   |        | 28-136 |      |      |     |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000       | 33.97   |        | 29-147 |      |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDF    | 2000       | 34.75   |        | 28-143 |      |      |     |
| 13C12-1,2,3,4,7,8,9-HpCDF    | 2000       | 35.54   |        | 26-143 |      |      |     |
|                              |            | 55.5    |        | 20 100 |      |      |     |
| Cleanup Standard             | pg         |         |        |        |      |      |     |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40         | 26.84   | 42     | 35-197 |      |      |     |
|                              |            |         | Conc.  | EDL    |      |      |     |
| Homologue Group Totals       |            | # peaks | pg     | pg     |      |      |     |
| Total-TCDD                   |            | 0.00    | <1.5   | 1.5    | U    |      | 10  |
| Total-PeCDD                  |            | 0.00    | <1.1   | 1.1    | U    |      | 50  |
|                              |            |         |        |        |      |      |     |
| Total-HxCDD                  |            | 0.00    | <1.3   | 1.3    | U    |      | 50  |
| Total-HpCDD                  |            | 0.00    | <3.0   | 3.0    | U    |      | 50  |
| Total-TCDF                   |            | 0.00    | <1.4   | 1.4    | U    |      | 10  |
| Total-PeCDF                  |            | 0.00    | <1.1   | 1.1    | U    |      | 50  |
| Total-HxCDF                  |            | 0.00    | <1.4   | 1.4    | U    |      | 50  |
| Total-HpCDF                  |            | 0.00    | <2.3   | 2.3    | U    |      | 50  |
|                              |            |         |        |        |      |      |     |
| Toxic Equivalency - (WHO     | 2005)      |         | pg     |        |      |      |     |

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Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency

 $Lower\ Quantification\ Limit,\ based\ on\ the\ lowest\ calibration\ level\ corrected\ for\ sample\ size,\ splits\ and\ dilutions.$ 

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

 $Indicates \ that \ the \ ion \ abundance \ ratio \ for \ this \ compound \ did \ not \ meet \ the \ acceptance \ criterion.$ 

#### **Laboratory Method Blank Analysis Report**

Sample Name Method Blank
ALS Sample ID WG3440853-4
Analysis Method EPA 1613B
Analysis Type Blank
Sample Matrix QC

Sampling Date n/a
Extraction Date 25-Nov-20

Extraction Date 25-Nov-20
Sample Size 1
Percent Moisture n/a
Split Ratio 2

Reagent

Approved: *T.Patterson* --e-signature--21-Dec-2020

Run Information Run 1

Instrument - Column HRMS-10 DB5MSUSO287833H

|                                                                        | TEF          | Ret.           | Conc.         | EDL              |        | ЕМРС |     |
|------------------------------------------------------------------------|--------------|----------------|---------------|------------------|--------|------|-----|
| Target Analytes                                                        | (WHO 2005)   | Time           | pg            |                  | lags   | pg   | LQL |
| - ,                                                                    |              |                |               |                  |        |      |     |
| 2,3,7,8-TCDD                                                           |              | NotFnd         | <1.2          | 1.2              | U      |      | 10  |
|                                                                        | 1            | NotFnd         | < 0.94        | 0.94             | U      |      | 50  |
|                                                                        | 0.1          | NotFnd         | < 0.91        | 0.91             | U      |      | 50  |
| 1,2,3,6,7,8-HxCDD                                                      | 0.1          | NotFnd         | < 0.72        | 0.72             | U      |      | 50  |
| 1,2,3,7,8,9-HxCDD                                                      | 0.1          | NotFnd         | < 0.76        | 0.76             | U      |      | 50  |
| 1,2,3,4,6,7,8-HpCDD                                                    | 0.01         | 35.32          | < 2.0         | 2.0              | M,U    | 1.4  | 50  |
|                                                                        | 0.0003       | 36.77          | 4.48          | 3.0              | М,Ј    |      | 100 |
| 2,3,7,8-TCDF                                                           | 0.1          | NotFnd         | <1.1          | 1.1              | U      |      | 10  |
| 1,2,3,7,8-PeCDF                                                        | 0.03         | NotFnd         | < 0.83        | 0.83             | U      |      | 50  |
| 2,3,4,7,8-PeCDF                                                        | 0.3          | NotFnd         | < 0.63        | 0.63             | U      |      | 50  |
|                                                                        | 0.1          | NotFnd         | < 0.49        | 0.49             | U      |      | 50  |
|                                                                        | 0.1          | 33.23          | < 0.57        | 0.46             | M,J,R  | 0.57 | 50  |
|                                                                        | 0.1          | NotFnd         | < 0.51        | 0.51             | U      |      | 50  |
|                                                                        | 0.1          | NotFnd         | < 0.73        | 0.73             | U      |      | 50  |
|                                                                        | 0.01         | 34.75          | 1.43          | 1.1              | M,J    |      | 50  |
|                                                                        | 0.01         | NotFnd         | <1.43         | 1.8              | U      |      | 5   |
|                                                                        | 0.0003       | 36.83          | <3.4          | 3.4              |        | 3.3  | :   |
|                                                                        | pg           | - 3.00         | % Rec         |                  | ,5     |      |     |
|                                                                        |              | 26.01          |               |                  |        |      |     |
|                                                                        | 2000         | 26.81          |               | 25-164           |        |      |     |
|                                                                        | 2000         | 31.51          |               | 25-181           |        |      |     |
|                                                                        | 2000         | 33.65          |               | 32-141           | R      |      |     |
|                                                                        | 2000         | 33.71          |               | 28-130           |        |      |     |
|                                                                        | 2000<br>4000 | 35.30<br>36.75 |               | 23-140<br>17-157 |        |      |     |
| 13C12-0CDD                                                             | 7000         | 30./5          | 50            | 1/-12/           |        |      |     |
| 13C12-2,3,7,8-TCDF                                                     | 2000         | 25.89          | 56            | 24-169           |        |      |     |
| 13C12-1,2,3,7,8-PeCDF                                                  | 2000         | 30.48          | 59            | 24-185           |        |      |     |
| 13C12-2,3,4,7,8-PeCDF                                                  | 2000         | 31.28          | 60            | 21-178           |        |      |     |
| 13C12-1,2,3,4,7,8-HxCDF                                                | 2000         | 33.15          | 57            | 26-152           |        |      |     |
| 13C12-1,2,3,6,7,8-HxCDF                                                | 2000         | 33.22          | 75            | 26-123           |        |      |     |
| 13C12-2,3,4,6,7,8-HxCDF                                                | 2000         | 33.56          | 69            | 28-136           |        |      |     |
| 13C12-1,2,3,7,8,9-HxCDF                                                | 2000         | 33.98          | 61            | 29-147           |        |      |     |
| 13C12-1,2,3,4,6,7,8-HpCDF                                              | 2000         | 34.75          | 67            | 28-143           |        |      |     |
|                                                                        | 2000         | 35.54          | 65            | 26-138           |        |      |     |
| Cleanup Standard                                                       | pg           |                |               |                  |        |      |     |
| 37Cl4-2,3,7,8-TCDD (Cleanup)                                           | 40           | 26.82          | 45            | 35-197           |        |      |     |
|                                                                        |              |                | Conc.         | EDL              |        |      |     |
| Homologue Group Totals                                                 |              | # peaks        | pg            | pg               |        |      |     |
| Total-TCDD                                                             |              | 0.00           | <1.2          | 1.2              | U      |      | 10  |
|                                                                        |              | 0.00           | < 0.94        | 0.94             | U      |      | 50  |
|                                                                        |              | 0.00           | < 0.91        | 0.91             | Ü      |      | 50  |
| Total-PeCDD                                                            |              | 0.00           |               | 2.0              | U      |      | 50  |
| Total-PeCDD<br>Total-HxCDD                                             |              | 0.00           | -2 n          |                  | U      |      | 20  |
| Total-PeCDD<br>Total-HxCDD<br>Total-HpCDD                              |              | 0.00           | <2.0          |                  |        |      | 10  |
| Total-PeCDD<br>Total-HxCDD<br>Total-HpCDD<br>Total-TCDF                |              | 0.00           | <1.1          | 1.1              | U      |      | 10  |
| Total-PeCDD<br>Total-HxCDD<br>Total-HpCDD<br>Total-TCDF<br>Total-PeCDF |              | 0.00<br>0.00   | <1.1<br><0.83 | 1.1<br>0.83      | U<br>U |      | 50  |
| Total-PeCDD<br>Total-HxCDD<br>Total-HpCDD<br>Total-TCDF                |              | 0.00           | <1.1          | 1.1              | U      |      |     |

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.

TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency.

M Indicates that a peak has been manually integrated.

U Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

J Indicates that a target analyte was detected below the calibrated range.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

EMPC Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

#### **Laboratory Control Sample Analysis Report**

Split Ratio

Sample Name

Laboratory Control Sample WG3440853-2 EPA 1613B LCS ALS Sample ID Analysis Method Analysis Type Sample Matrix QC

Sampling Date Extraction Date Sample Size Percent Moisture 25-Nov-20 1 n/a

2

Approved: T.Patterson --e-signature-n/a 21-Dec-2020

Run Information Run 1

10-201218A03 Filename Run Date 18-Dec-20 15:39 Final Volume 10 uL Dilution Factor 1 Analysis Units %

Instrument - Column HRMS-10 DB5MSUSO287833H

|                              | pg   | Ret.   |        | Limits |       |
|------------------------------|------|--------|--------|--------|-------|
| Target Analytes              |      | Time   | % Rec  |        | Flags |
| Target Analytes              |      | 111110 | 70 Rec |        | liags |
| 2,3,7,8-TCDD                 | 200  | 26.81  | 83     | 67-158 |       |
| 1,2,3,7,8-PeCDD              | 1000 | 31.51  | 110    | 70-142 |       |
| 1,2,3,4,7,8-HxCDD            | 1000 | 33.65  | 104    | 70-164 |       |
| 1,2,3,6,7,8-HxCDD            | 1000 | 33.71  | 96     | 76-134 |       |
| 1,2,3,7,8,9-HxCDD            | 1000 | 33.83  | 99     | 64-162 |       |
| 1,2,3,4,6,7,8-HpCDD          | 1000 | 35.30  | 103    | 70-140 |       |
| OCDD                         | 2000 | 36.75  | 88     | 78-144 |       |
| 2,3,7,8-TCDF                 | 200  | 25.91  | 88     | 75-158 |       |
| 1,2,3,7,8-PeCDF              | 1000 | 30.48  | 108    | 80-134 |       |
| 2,3,4,7,8-PeCDF              | 1000 | 31.27  | 98     | 68-160 |       |
| 1,2,3,4,7,8-HxCDF            | 1000 | 33.15  | 101    | 72-134 |       |
| 1,2,3,6,7,8-HxCDF            | 1000 | 33.21  | 101    | 84-130 |       |
| 2,3,4,6,7,8-HxCDF            | 1000 | 33.55  | 100    | 70-156 |       |
| 1,2,3,7,8,9-HxCDF            | 1000 | 33.97  | 108    | 78-130 |       |
| 1,2,3,4,6,7,8-HpCDF          | 1000 | 34.75  | 103    | 82-122 |       |
| 1,2,3,4,7,8,9-HpCDF          | 1000 | 35.53  | 108    | 78-138 |       |
| OCDF                         | 2000 | 36.82  | 103    | 63-170 |       |
| Extraction Standards         | pg   |        | % Rec  | Limits |       |
| 13C12-2,3,7,8-TCDD           | 2000 | 26.80  | 55     | 20-175 |       |
| 13C12-1,2,3,7,8-PeCDD        | 2000 | 31.50  | 52     | 21-227 |       |
| 13C12-1,2,3,4,7,8-HxCDD      | 2000 | 33.64  | 69     | 21-193 |       |
| 13C12-1,2,3,6,7,8-HxCDD      | 2000 | 33.70  | 72     | 25-163 |       |
| 13C12-1,2,3,4,6,7,8-HpCDD    | 2000 | 35.29  | 57     | 26-166 |       |
| 13C12-OCDD                   | 4000 | 36.74  | 41     | 13-138 |       |
| 13C12-2,3,7,8-TCDF           | 2000 | 25.88  | 55     | 22-152 |       |
| 13C12-1,2,3,7,8-PeCDF        | 2000 | 30.47  | 52     | 21-192 |       |
| 13C12-2,3,4,7,8-PeCDF        | 2000 | 31.25  | 51     | 13-328 |       |
| 13C12-1,2,3,4,7,8-HxCDF      | 2000 | 33.13  | 73     | 19-202 |       |
| 13C12-1,2,3,6,7,8-HxCDF      | 2000 | 33.20  | 74     | 21-159 |       |
| 13C12-2,3,4,6,7,8-HxCDF      | 2000 | 33.54  | 71     | 22-176 |       |
| 13C12-1,2,3,7,8,9-HxCDF      | 2000 | 33.96  | 66     | 17-205 |       |
| 13C12-1,2,3,4,6,7,8-HpCDF    | 2000 | 34.74  |        | 21-158 |       |
| 13C12-1,2,3,4,7,8,9-HpCDF    | 2000 | 35.53  | 59     | 20-186 |       |
| Cleanup Standard             | pg   |        |        |        |       |
| 37Cl4-2,3,7,8-TCDD (Cleanup) | 40   | 26.81  | 45     | 31-191 |       |
|                              |      |        |        |        |       |

Chain of Custody (COC) / Analytical

Request Form

Canada Toll Free: 1 800 668 9878

ALS) Environmental

2526958-COFC

000 Number 17 - 792336

Page

图口 Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) SAMPLES ON HOLD Same Day, Weekend or Statutory holiday [E2 -200% FINAL COOLER TEMPERATURES & au au ŧ £ dd-mmm-yy hh:mm Standard TAT if received by 3 pm - business days - no surcharges apply FINAL SHIPMENT RECEPTION (lab use office) (Laboratory opening fees may apply) SAMPLE CONDITION AS RECEIVED (lab use only) Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below 口囟 or tests that can not be performed according to the service level selected, you will be contacted 1 Business day [E - 100%] **Analysis Request** Custody seal intact Date and Time Required for all E&P TATS K Ice Cubes Regular [R] 🗡 Received by: 4 day [P4-20%] 3 day [P3-25%] 图 2 day [P2-50%] MOUND MENDE Cooling Initiated Time: 13:50 %.y. €.y. ce Packs Frozen NUMBER OF CONTAINERS Email 1 or Fax SV IVable (artox Grandale C. W. wipe Email 1 or Fax SVIVANCO/A-ToxSTAKGIES.CM N P AND BOOK NA SE 8 Ž Sample Type Nipp NIPE STATE OF S S Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only) INITIAL SHIPMENT RECEPTION (lab use only) Quality Control (QC) Report with Report | X vest | X ED (DISTIAL) Compare Results to Criteria on Report - provide details below if box checked Select Distribution: Bath - Nov. Zone X EMAIL 🗍 MAIL 🗍 FAX Oil and Gas Required Fields (client use) Routing Code: Report Format / Distribution (hh:mm) Time Invoice Distribution Sampler: 302/20/ 0202/140/ 07002/00/11 11/03/2020 1/03/2020 1/03/120 07st 140/ proc/Poli 1/04/1020 11/63/2020 202/606 1/04/2020 Perro Select Invoice Distribution: Received by Aajor/Minor Code ALS Contact: Requisitioner: AFE/Cost Center: Location Email 2 Email 3 Email 2 Date: 1)/02/2020 [600] ALS 6020-283 Sample Identification and/or Coordinates (This description will appear on the report) 260 Contact and company name below will appear on the final repor VES NO Company address below will appear on the final report 27001 La Par Rd Suite ENG-558- DFP-02 ENG-558-0FP-0 583 -0FP-02 ENG-583-DFP-0 DFP- BLANK SHIPMENT RELEASE (client use) Stophanie VIVanio Mission vieto CA 649-382-1524 Project Information 13A-3-Blank Drinking Water (DW) Samples1 (client use) re samples taken from a Regulated DW System? Ox Stratal Copy of Invoice with Report www.alsglobal.com ALS Lab Work Order # (lab use only): Are samples for human consumption! use? 356-4 356-4 Same as Report To D-70 139-₩ **X** SEX ALS Account # / Quote #: ALS'Semple \* (Reb use only) Sity/Province: Released by: Postal Code œ 10 Ξ ک nvoice To 5 Report To Company: Ġ PO / AFE: Sompany Ч 3 7 Contact Contact: Phone: Street: Job #: ŝ

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form



1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6 Phone: 905-331-3111, FAX: 905-331-4567

## **Certificate of Analysis**

ALS Project Contact: Lynne Wrona Client Name:

ALS Project ID: TOXS100 Client Address: 27001 La Paz Road, Suite 260

ALS WO#: L2526958 Mission Viejo, CA

Date of Report Revision 2-Feb-21 92691

Date of Sample Receipt 6-Nov-20 Client Contact: Stephanie Vivanco

Client Project ID: LA FIRE

**ToxStrategies** 

COMMENTS: PCB Congeners by EPA 1668C

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values,

consistent with USEPA CLP SOW CBC1.2

PCB-209 was detected in the method blanks above the method control limit. Reported sample data for this target may be elevated as a result.

\*\*\* REVISED REPORT \*\*\* (22-Dec-20)

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:

The Laboratory Control Sample (LCS) was corrected for the levels in the Method Blank (elevated background level of PCB-209 caused marginal QC failure for native PCB-209 recovery)

\*\*\* REVISED REPORT #2 \*\*\* (2-Feb-21)

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:

The recovery of 13C-PCB-209 Extraction (internal) Standard in the Laboratory Control Sample was below the method acceptance criterion. Native results calculated by Isotope Dilution are inherently recovery corrected so no significant impact to overall data quality is expected. The client samples demonstrated control within the method criteria for all Extraction Standards and were not impacted.

Certified by:

Bradley Reimer

GC/MS Laboratory Senior Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.

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|                                |                       | LS Life Sc               |                        |                       |                       |                   |
|--------------------------------|-----------------------|--------------------------|------------------------|-----------------------|-----------------------|-------------------|
| Sample Name                    | Sam<br>BA-1           | ple Analysis Sum<br>BA-2 | mary Report BA-3-BLANK | 356-4                 | 356-5                 | ENG-558-DFP-      |
| ватріє нате                    | BA-1                  | ВА-2                     | BA-3-BLANK             | 356-4                 | 356-5                 | ENG-558-DFP-      |
| .LS Sample ID                  | L2526958-1            | L2526958-2               | L2526958-3             | L2526958-4            | L2526958-5            | L2526958          |
| ample Size                     | 1                     | 1                        | 1                      | 1                     | 1                     |                   |
| ample size units               | Sample                | Sample                   | Sample                 | Sample                | Sample                | Samp              |
| ercent Moisture                | n/a                   | n/a                      | n/a                    | n/a                   | n/a                   | r                 |
| ample Matrix                   | Swab                  | Swab                     | Swab                   | Swab                  | Swab                  | Sw<br>4-Nov-      |
| ampling Date<br>xtraction Date | 3-Nov-20<br>25-Nov-20 | 3-Nov-20<br>25-Nov-20    | 3-Nov-20<br>25-Nov-20  | 3-Nov-20<br>25-Nov-20 | 3-Nov-20<br>25-Nov-20 | 4-Nov-<br>25-Nov- |
| arget Analytes                 | pg                    | pg                       | pg                     | pg                    | pg                    |                   |
| PCB-001                        | <5.0                  | <3.2                     | 2.28                   | <2.0                  | <1.6                  | <                 |
| PCB-002                        | 6.47                  | 7.71                     | 3.29                   | 2.43                  | <1.3                  | 4                 |
| PCB-003                        | <7.9                  | 8.07                     | 4.51                   | 3.73                  | <2.5                  | 5                 |
| PCB-004                        | 7.30                  | 7.11                     | <3.4                   | <2.2                  | <2.8                  | <                 |
| PCB-010                        | <0.99                 | <1.6                     | <2.3                   | <1.4                  | <1.5                  | <0                |
| PCB-009                        | <0.99                 | <1.6                     | <2.3                   | <1.4                  | <1.5                  | <                 |
| PCB-007                        | 7.12                  | 17.3                     | <2.2                   | <1.3                  | <1.4                  | 4                 |
|                                |                       | 10.1                     | <2.3                   | <1.4                  |                       | <                 |
| PCB-006<br>PCB-005             | <8.3                  | 10.1<br><1.9             |                        |                       | <1.5                  | <                 |
|                                | <1.6                  |                          | < 2.6                  | <1.6                  | <1.7                  |                   |
| PCB-008                        | <0.92                 | 18.9                     | <2.1                   | <7.1                  | 8.58                  | 2                 |
| PCB-014                        | <1.0                  | <1.5                     | <2.9                   | <1.7                  | <2.0                  | <                 |
| PCB-011                        | 329                   | 445                      | 46.0                   | 69.1                  | 77.6                  |                   |
| PCB-012/013                    | 22.7                  | 20.1                     | <3.0                   | <1.8                  | <2.0                  | *                 |
| PCB-015                        | 24.5                  | <9.4                     | <3.6                   | <3.6                  | <2.4                  | 2                 |
| PCB-019                        | <1.3                  | 2.93                     | <1.3                   | <1.0                  | <1.1                  | <                 |
| PCB-018/030                    | 16.3                  | 17.4                     | <4.0                   | 7.35                  | 8.54                  | 2                 |
| PCB-017                        | 8.11                  | 7.31                     | <1.6                   | <3.6                  | 4.17                  | 1                 |
| PCB-027                        | < 0.62                | <1.1                     | <1.2                   | < 0.85                | <1.1                  | <                 |
| PCB-024                        | < 0.52                | <1.1                     | <1.2                   | <0.85                 | <1.1                  | <0                |
| PCB-016                        | 7.90                  | <8.0                     | <1.9                   | 3.38                  | <4.0                  | <                 |
| PCB-032                        | 4.43                  | <4.4                     | <1.1                   | 2.32                  | 2.58                  | 1                 |
| PCB-034                        | < 0.65                | <1.1                     | <1.3                   | <1.1                  | <1.5                  | <                 |
| PCB-023                        | < 0.61                | <1.0                     | <1.2                   | <1.0                  | <1.4                  | <0                |
| PCB-026/029                    | <5.3                  | 4.79                     | <1.2                   | 2.64                  | <1.4                  | 8                 |
| PCB-025                        | <2.5                  | 1.94                     | <1.1                   | <0.91                 | <1.3                  | <                 |
| PCB-031                        | 28.7                  | <19                      | 7.47                   | 12.9                  | 11.0                  | 5                 |
| PCB-020/028                    | 34.2                  | 23.3                     | <1.2                   | <1.0                  | <1.4                  | 7                 |
| PCB-021/033                    | 20.9                  | <14                      | 5.22                   | 10.2                  | 8.53                  | 4                 |
| PCB-022                        | 12.8                  | 9.68                     | <2.0                   | 5.57                  | 5.22                  | 2                 |
| PCB-036                        | < 0.61                | <1.0                     | <1.2                   | <1.0                  | <1.4                  | <                 |
| PCB-039                        | <0.62                 | <1.0                     | <1.2                   | <1.0                  | <1.4                  | <0                |
| PCB-039                        | < 0.67                | <1.1                     | <1.3                   | <1.1                  | <1.5                  | <                 |
| PCB-035                        | 11.1                  | 9.12                     | <1.4                   | <1.2                  | <1.6                  |                   |
| PCB-033                        | 22.9                  | <7.8                     | <3.0                   | 7.81                  | <3.4                  | 3                 |
|                                |                       | <0.35                    |                        | <0.44                 |                       | <0                |
| PCB-054                        | <0.26                 |                          | < 0.58                 |                       | < 0.55                |                   |
| PCB-050/053                    | 2.81                  | 3.52                     | <1.5                   | <0.95                 | 0.992                 | 6                 |
| PCB-045/051                    | 5.23                  | 15.7                     | 2.05                   | 2.39                  | 2.46                  | 1                 |
| PCB-046                        | <0.92                 | <1.1                     | <1.8                   | <0.82                 | <0.97                 | 2                 |
| PCB-052                        | 36.5                  | 32.3                     | <5.2                   | 8.53                  | <7.6                  | 6                 |
| PCB-073                        | <0.30                 | < 0.74                   | <1.2                   | <0.54                 | <0.64                 | <0                |
| PCB-043                        | <1.0                  | <1.3                     | <2.0                   | < 0.93                | <1.1                  | <                 |
| PCB-049/069                    | 14.6                  | 11.8                     | 2.57                   | 3.80                  | <3.2                  | 2                 |
| PCB-048                        | <4.9                  | 4.58                     | <1.6                   | <1.6                  | <0.90                 | 1                 |
| PCB-044/047/065                | 40.8                  | 58.7                     | <6.4                   | 9.65                  | 8.19                  | 6                 |
| PCB-059/062/075                | <2.2                  | <1.8                     | <1.2                   | < 0.56                | < 0.66                | 4                 |
| PCB-042                        | <6.4                  | 5.84                     | <1.8                   | 1.99                  | <1.9                  | 1                 |
| PCB-040/041/071                | 16.5                  | 11.8                     | <1.8                   | 4.36                  | 4.83                  | 3                 |
| PCB-064                        | 13.2                  | 9.10                     | <2.0                   | 3.22                  | 2.78                  | 2                 |
| PCB-072                        | <0.57                 | < 0.94                   | < 0.92                 | < 0.65                | <0.83                 | <0                |
| PCB-068                        | 4.12                  | 10.6                     | < 0.86                 | < 0.70                | <0.78                 | 4                 |
| PCB-057                        | < 0.61                | <1.0                     | < 0.98                 | < 0.69                | < 0.89                | <0                |
| PCB-058                        | <0.55                 | < 0.91                   | < 0.89                 | < 0.63                | < 0.81                | 1                 |
| PCB-067                        | < 0.51                | < 0.84                   | <0.82                  | <0.58                 | < 0.75                | 1                 |
| PCB-063                        | <0.56                 | < 0.93                   | < 0.91                 | < 0.64                | < 0.82                | <                 |
| PCB-061/070/074/076            | 82.0                  | 33.4                     | 6.47                   | 10.1                  | <8.4                  | :                 |
| PCB-066                        | 38.4                  | 12.7                     | <2.4                   | <4.0                  | 5.26                  | 5                 |
| PCB-055                        | <0.62                 | <1.0                     | <1.0                   | < 0.71                | <0.90                 | 2                 |
| PCB-056                        | 26.2                  | 12.3                     | <3.5                   | 8.91                  | 8.41                  | 3                 |
| PCB-060                        | 12.6                  | 3.75                     | <0.99                  | 1.70                  | 0.918                 | -                 |
| PCB-080                        | <0.53                 | <0.88                    | < 0.86                 | <0.61                 | <0.78                 | <0                |
| PCB-079                        | <0.73                 | < 0.93                   | <0.91                  | < 0.65                | <0.83                 | <                 |
| PCB-079                        | <0.67                 | <1.1                     | <1.1                   | < 0.76                | <0.98                 | <                 |
| PCB-076                        | <0.70                 | <1.3                     | <1.2                   | <0.80                 | <1.1                  | <                 |
| PCB-081<br>PCB-077             |                       | 6.85                     | <1.3                   | 1.89                  | <1.5                  | 1.                |
|                                | 11.3                  |                          |                        |                       |                       |                   |
| PCB-104                        | <0.38                 | <0.85                    | <0.87                  | <0.87                 | <0.90                 | <0                |
| PCB-096                        | <0.36                 | <0.95                    | <0.87                  | <0.83                 | <0.90                 | <0                |
| PCB-103                        | <0.72                 | <1.6                     | <1.5                   | <0.97                 | <1.1                  | <0                |
| PCB-094                        | <0.84                 | <1.9                     | <1.7                   | <1.1                  | <1.3                  | <                 |
| PCB-095                        | 45.3                  | 25.8                     | <2.7                   | 3.63                  | 5.34                  | 4                 |

|                                 |                  | LS Life Sc               |                        |                  |                  |              |
|---------------------------------|------------------|--------------------------|------------------------|------------------|------------------|--------------|
| Samnie Name                     | Sam<br>BA-1      | ple Analysis Sum<br>BA-2 | mary Report BA-3-BLANK | 356-4            | 356-5            | ENG-558-DFP- |
| Sample Name                     | BA-1             | BA-2                     | BA-3-BLANK             | 356-4            | 350-5            | ENG-558-DFP- |
| iLS Sample ID                   | L2526958-1       | L2526958-2               | L2526958-3             | L2526958-4       | L2526958-5       | L2526958     |
| ample Size                      | 1                | 1                        | 1                      | 1                | 1                |              |
| ample size units                | Sample           | Sample                   | Sample                 | Sample           | Sample           | Sam          |
| ercent Moisture<br>ample Matrix | n/a              | n/a<br>Swab              | n/a<br>Swah            | n/a<br>Swab      | n/a<br>Swah      | e.           |
| ampling Date                    | Swab<br>3-Nov-20 | Swab<br>3-Nov-20         | Swab<br>3-Nov-20       | Swab<br>3-Nov-20 | Swab<br>3-Nov-20 | Sv<br>4-Nov  |
| xtraction Date                  | 25-Nov-20        | 25-Nov-20                | 25-Nov-20              | 25-Nov-20        | 25-Nov-20        | 25-Nov       |
| arget Analytes                  | pg               | pg                       | pg                     | pg               | pg               |              |
| PCB-088/091                     | 8.67             | 4.45                     | <1.7                   | <1.1             | <1.2             | 1            |
| PCB-084                         | 20.7             | 9.96                     | <1.9                   | <2.1             | <1.4             | 1            |
| PCB-089                         | <1.2             | <2.1                     | <1.9                   | <1.2             | <1.4             | <            |
| PCB-121                         | < 0.61           | <1.4                     | <1.3                   | < 0.81           | < 0.93           | <0           |
| PCB-092                         | 13.8             | 8.60                     | <1.9                   | <1.2             | <1.4             | 1            |
| PCB-090/101/113                 | 80.4             | 38.2                     | <3.6                   | 6.47             | 6.11             | 7            |
| PCB-083/099                     | 46.5             | <16                      | <1.9                   | <2.2             | <2.8             | 4            |
| PCB-112                         | <0.64            | <1.4                     | <1.3                   | <0.85            | <0.98            | <0           |
| PCB-086/087/097/109/119/125     | 77.1             | 29.6                     | <1.6                   | <6.0             | <1.8             | 6            |
| PCB-085/110/115/116/117         | 160              | 61.2                     | < 3.4                  | 8.71             | 8.72             |              |
| PCB-082                         | <15              | < 6.5                    | <2.4                   | <1.6             | <1.8             | 1            |
| PCB-111                         | < 0.66           | <1.5                     | <1.4                   | < 0.88           | <1.0             | <0           |
| PCB-120                         | <0.65<br>5.09    | <1.5<br><2.0             | <1.4                   | <0.87            | <1.0             | <0           |
| PCB-108/124<br>PCB-107          | 5.09<br><6.6     | <2.0<br><1.8             | <1.5<br><1.3           | <1.2<br><1.1     | <1.5<br><1.3     | 3            |
| PCB-107<br>PCB-123              | <0.6<br><1.7     | <1.8<br><2.4             | <1.3<br><1.6           | <1.1<br><1.4     | <1.3<br><1.7     | 1            |
| PCB-123<br>PCB-106              | <1.7             | <2.4<br><2.1             | <1.5<br><1.5           | <1.4<br><1.3     | <1.7             | <            |
| PCB-118                         | 118              | <2.1<br>46.9             | <1.5<br><1.5           | <1.3<br>8.44     | <1.6<br><5.8     | 9            |
| PCB-122                         | 2.44             | <2.3                     | <1.6                   | <1.4             | <1.7             | <            |
| PCB-114                         | 3.39             | <2.2                     | <1.5                   | <1.3             | <1.6             | 2            |
| PCB-105                         | 54.3             | <17                      | <1.6                   | 3.33             | <1.7             | 4            |
| PCB-127                         | <1.3             | <2.2                     | <1.6                   | <1.4             | <1.7             | <            |
| PCB-126                         | <1.7             | <3.1                     | <1.9                   | <1.5             | <2.0             | <            |
| PCB-155                         | < 0.45           | <1.1                     | < 0.62                 | < 0.73           | < 0.75           | <            |
| PCB-152                         | < 0.41           | < 0.87                   | < 0.60                 | < 0.46           | < 0.58           | <0           |
| PCB-150                         | < 0.40           | < 0.84                   | < 0.57                 | < 0.45           | < 0.55           | <0           |
| PCB-136                         | 8.67             | 7.54                     | < 0.64                 | <1.0             | < 0.60           | g            |
| PCB-145                         | < 0.43           | < 0.91                   | < 0.62                 | < 0.49           | < 0.60           | <0           |
| PCB-148                         | < 0.61           | <1.3                     | <0.88                  | <0.68            | < 0.85           | <0           |
| PCB-135/151                     | 25.9             | 16.6                     | < 0.93                 | <1.4             | <0.90            | 2            |
| PCB-154                         | < 0.50           | <1.1                     | <0.73                  | < 0.57           | <0.70            | <0           |
| PCB-144                         | 4.66             | 2.72                     | <0.95                  | < 0.74           | <0.92            | 3            |
| PCB-147/149                     | 74.5             | 45.3                     | <2.0                   | <5.9             | <4.7             | 8            |
| PCB-134/143                     | <5.7<br><2.4     | <2.0<br><1.6             | <1.7<br><1.4           | <1.0<br><0.84    | <1.5<br><1.3     | 5<br>2       |
| PCB-139/140<br>PCB-131          | <1.6             | <2.0                     | <1.4                   | <1.1             | <1.6             | <            |
| PCB-142                         | <1.3             | <2.0                     | <1.7                   | <1.0             | <1.5             | <            |
| PCB-132                         | 43.6             | 25.3                     | <1.6                   | <1.0             | <2.8             | 4            |
| PCB-133                         | <1.4             | <1.9                     | <1.6                   | <0.97            | <1.5             | <            |
| PCB-165                         | <0.98            | <1.4                     | <1.2                   | <0.74            | <1.1             | <0           |
| PCB-146                         | 14.2             | <7.7                     | <1.4                   | <1.1             | <1.3             | 1            |
| PCB-161                         | <0.94            | <1.4                     | <1.2                   | < 0.72           | <1.1             | <0           |
| PCB-153/168                     | 85.3             | 50.3                     | <2.5                   | 6.28             | 5.75             | 8            |
| PCB-141                         | 26.8             | 12.4                     | <1.6                   | 1.30             | <1.5             | 2            |
| PCB-130                         | <7.3             | <4.3                     | <1.9                   | <1.2             | <1.8             | <            |
| PCB-137/164                     | <14              | 10.3                     | <1.4                   | < 0.85           | <1.3             | 1            |
| PCB-129/138/163                 | 148              | 75.7                     | <3.3                   | 11.4             | <8.3             |              |
| PCB-160                         | <1.0             | <1.5                     | <1.3                   | <0.78            | <1.2             | <0           |
| PCB-158                         | 15.2             | 9.90                     | <1.0                   | <0.90            | <0.96            | 1            |
| PCB-128/166                     | <20              | 11.9                     | <1.4                   | <0.88            | <1.3             | 2            |
| PCB-159<br>PCB-162              | <0.99            | <1.4                     | <1.2                   | <0.75<br><0.78   | <1.1<br><1.2     | <0<br><0     |
| PCB-162<br>PCB-167              | <1.0<br><5.3     | <1.5<br>3.00             | <1.3<br><1.0           | <0.78<br><0.62   | <1.2<br><0.96    | <0<br>5      |
| PCB-167<br>PCB-156/157          | <5.3<br><15      | 3.00<br><3.5             | <1.4                   | <0.62<br><2.1    | <1.3             | 1            |
| PCB-130/137                     | <1.1             | <1.4                     | <1.3                   | <0.65            | <1.0             | <0           |
| PCB-188                         | <0.49            | <1.1                     | < 0.63                 | <0.58            | <0.89            | <0           |
| PCB-179                         | 6.30             | 5.49                     | <0.66                  | <0.48            | <0.83            | 8            |
| PCB-184                         | <0.55            | < 0.86                   | <0.59                  | <0.43            | <0.75            | <            |
| PCB-176                         | <1.4             | 2.12                     | <0.67                  | <0.49            | <0.85            | 2            |
| PCB-186                         | <0.60            | <1.0                     | <0.68                  | <0.50            | <0.87            | <0           |
| PCB-178                         | <4.1             | <4.7                     | <1.0                   | < 0.74           | <1.3             | 5            |
| PCB-175                         | <0.87            | <1.5                     | <1.0                   | < 0.73           | <1.3             | <            |
| PCB-187                         | 20.3             | 18.8                     | < 0.85                 | <1.6             | <2.0             | 2            |
| PCB-182                         | <0.81            | <1.4                     | < 0.93                 | <0.68            | <1.2             | <            |
| PCB-183                         | 12.0             | 12.8                     | < 0.94                 | < 0.69           | <1.2             | 1            |
| PCB-185                         | <1.7             | <1.4                     | <0.96                  | < 0.70           | <1.2             | <            |
| PCB-174                         | 20.8             | 19.2                     | <1.0                   | <0.84            | <1.3             | 2            |
| PCB-177                         | 10.2             | <6.3                     | <1.1                   | < 0.81           | <1.4             | 1            |
| PCB-181                         | <0.88            | <1.5                     | <1.0                   | <0.74            | <1.3             | <            |
| PCB-171/173<br>PCB-172          | 6.74<br>3.89     | 6.42<br><3.1             | <1.1<br><1.1           | <0.81<br><0.81   | <1.4<br><1.4     | <            |

|                                | Α              | LS Life So       | iences        |                |                |               |
|--------------------------------|----------------|------------------|---------------|----------------|----------------|---------------|
|                                | Sam            | ple Analysis Sun | nmary Report  |                |                |               |
| Sample Name                    | BA-1           | BA-2             | BA-3-BLANK    | 356-4          | 356-5          | ENG-558-DFP-0 |
| ILS Sample ID                  | L2526958-1     | L2526958-2       | L2526958-3    | L2526958-4     | L2526958-5     | L2526958      |
| iample Size                    | 1              | 1                | 1             | 1              | 1              |               |
| ample size units               | Sample         | Sample           | Sample        | Sample         | Sample         | Samp          |
| ercent Moisture                | n/a            | n/a              | n/a           | n/a            | n/a            | r             |
| ample Matrix                   | Swab           | Swab             | Swab          | Swab           | Swab           | Sw            |
| ampling Date                   | 3-Nov-20       | 3-Nov-20         | 3-Nov-20      | 3-Nov-20       | 3-Nov-20       | 4-Nov-        |
| xtraction Date                 | 25-Nov-20      | 25-Nov-20        | 25-Nov-20     | 25-Nov-20      | 25-Nov-20      | 25-Nov-       |
| arget Analytes                 | pg             | pg               | pg            | pg             | pg             |               |
| PCB-192                        | < 0.74         | <1.2             | <0.85         | < 0.62         | <1.1           | <:            |
| PCB-180/193                    | 44.6           | 51.0             | <1.1          | 4.89           | <2.0           | 4.            |
| PCB-191                        | <1.4           | <1.0             | <0.72         | <0.53          | < 0.91         | <0            |
| PCB-170                        | 17.4           | <14              | <0.83         | <0.78          | 1.56           | 1             |
| PCB-190                        | <3.4           | <2.8             | < 0.52        | < 0.38         | < 0.66         | 3             |
| PCB-189                        | 1.46           | <0.88            | < 0.64        | < 0.47         | <0.57          | <             |
| PCB-202                        | <2.4           | 2.17             | < 0.97        | < 0.87         | <0.82          | <             |
| PCB-201                        | 2.03           | <0.98            | <1.0          | <0.74          | < 0.80         | <             |
| PCB-204<br>PCB-197             | <0.49<br><0.54 | <0.97<br><0.95   | <1.0<br><0.98 | <0.74<br><0.72 | <0.79<br><0.77 | <0<br><0      |
| PCB-197<br>PCB-200             | <0.54<br><0.50 | <0.95<br><0.99   | <0.98<br><1.0 | <0.75          | <0.77          | <0            |
| PCB-198/199                    | 6.94           | 7.94             | <0.98         | <0.72          | <0.77          | 8             |
| PCB-196                        | <3.5           | 3.34             | <0.96         | < 0.71         | <0.76          | <             |
| PCB-203                        | 5.42           | <3.2             | <0.95         | <0.70          | <0.75          | 5             |
| PCB-195                        | <3.0           | <2.6             | <0.95         | < 0.87         | <0.89          | <             |
| PCB-194                        | 10.4           | <6.5             | 1.70          | <1.9           | <1.0           | 9             |
| PCB-205                        | <0.92          | < 0.86           | <0.92         | <0.71          | < 0.81         | <0            |
| PCB-208                        | <2.5           | <5.1             | <2.0          | 3.43           | <2.1           | 5             |
| PCB-207                        | <1.8           | <2.6             | <2.0          | <1.7           | <1.9           | <             |
| PCB-206                        | 9.73           | 11.5             | <2.8          | 4.34           | 7.41           | 1             |
| PCB-209                        | 38.8           | 222              | 134           | 116            | <130           | 1             |
| Extraction Standards           | % Rec          | % Rec            | % Rec         | % Rec          | % Rec          | % R           |
| 13C12-PCB-001                  | 54             | 66               | 56            | 52             | 54             |               |
| 13C12-PCB-003                  | 61             | 61               | 48            | 51             | 53             |               |
| 13C12-PCB-004                  | 67             | 73               | 56            | 54             | 56             |               |
| 13C12-PCB-015                  | 59             | 62               | 50            | 51             | 51             |               |
| 13C12-PCB-019                  | 69             | 70               | 56            | 53             | 55             |               |
| 13C12-PCB-037                  | 65             | 71               | 53            | 57             | 54             |               |
| 13C12-PCB-054                  | 81             | 90               | 66            | 67             | 69             |               |
| 13C12-PCB-081                  | 71             | 74               | 63            | 70             | 61             |               |
| 13C12-PCB-077                  | 69             | 70               | 63            | 70             | 60             |               |
| 13C12-PCB-104<br>13C12-PCB-123 | 88<br>67       | 106<br>70        | 75<br>61      | 83<br>68       | 77<br>61       |               |
| 13C12-PCB-123<br>13C12-PCB-118 | 65             | 70<br>67         | 62            | 68             | 60             |               |
| 13C12-PCB-114                  | 70             | 72               | 64            | 72             | 63             |               |
| 13C12-PCB-105                  | 69             | 68               | 65            | 72             | 64             |               |
| 13C12-PCB-126                  | 63             | 62               | 60            | 71             | 59             |               |
| 13C12-PCB-155                  | 78             | 43               | 52            | 39             | 44             |               |
| 13C12-PCB-167                  | 75             | 84               | 71            | 79             | 70             |               |
| 13C12-PCB-156/157              | 77             | 85               | 72            | 81             | 71             |               |
| 13C12-PCB-169                  | 77             | 85               | 71            | 89             | 77             |               |
| 13C12-PCB-188                  | 93             | 63               | 70            | 55             | 61             |               |
| 13C12-PCB-189                  | 74             | 90               | 70            | 85             | 75             |               |
| 13C12-PCB-202                  | 76             | 60               | 69            | 61             | 66             |               |
| 13C12-PCB-205                  | 104            | 138              | 82            | 95             | 84             | 1             |
| 13C12-PCB-208                  | 82             | 47               | 61            | 44             | 51             |               |
| 13C12-PCB-206<br>13C12-PCB-209 | 92<br>88       | 96<br>29         | 80<br>34      | 95<br>26       | 86<br>27       |               |
| Cleanup Standards              |                |                  |               |                |                |               |
| 13C12-PCB-028                  | 70             | 82               | 64            | 67             | 65             |               |
|                                |                |                  |               |                |                |               |
| 13C12-PCB-111                  | 72             | 77               | 67            | 73             | 64             |               |

|                               | Α          | LS Life So       | ciences      |            |            |                |
|-------------------------------|------------|------------------|--------------|------------|------------|----------------|
|                               | Sam        | ple Analysis Sun | nmary Report |            |            |                |
| Sample Name                   | BA-1       | BA-2             | BA-3-BLANK   | 356-4      | 356-5      | ENG-558-DFP-02 |
| ALS Sample ID                 | L2526958-1 | L2526958-2       | L2526958-3   | L2526958-4 | L2526958-5 | L2526958-6     |
| Sample Size                   | 1          | 1                | 1            | 1          | 1          |                |
| Sample size units             | Sample     | Sample           | Sample       | Sample     | Sample     | Sample         |
| Percent Moisture              | n/a        | n/a              | n/a          | n/a        | n/a        | n/a            |
| Sample Matrix                 | Swab       | Swab             | Swab         | Swab       | Swab       | Swat           |
| Sampling Date                 | 3-Nov-20   | 3-Nov-20         | 3-Nov-20     | 3-Nov-20   | 3-Nov-20   | 4-Nov-20       |
| Extraction Date               | 25-Nov-20  | 25-Nov-20        | 25-Nov-20    | 25-Nov-20  | 25-Nov-20  | 25-Nov-20      |
| Target Analytes               | pg         | pg               | pg           | pg         | pg         | pg             |
| Homologue Group Totals        |            |                  |              |            |            |                |
| Total MonoCB                  | 19.4       | 19.0             | 10.1         | 8.16       | 5.40       | 10.5           |
| Total DiCB                    | 401        | 528              | 46.0         | 79.8       | 89.0       | 82             |
| Total TriCB                   | 177        | 130              | 21.7         | 55.8       | 47.4       | 333            |
| Total TetraCB                 | 320        | 235              | 32.4         | 63.8       | 57.3       | 52             |
| Total PentaCB                 | 662        | 264              | 9.70         | 40.9       | 30.6       | 588            |
| Total HexaCB                  | 520        | 286              | 8.44         | 31.4       | 21.6       | 52             |
| Total HeptaCB                 | 156        | 147              | 1.10         | 8.92       | 5.56       | 17:            |
| Total OctaCB                  | 35.2       | 25.8             | 1.70         | 1.90       | 1.00       | 36.2           |
| Total NonaCB                  | 14.0       | 16.6             | <2.0         | 7.77       | 7.41       | 19.9           |
| DecaCB                        | 38.8       | 222              | 134          | 116        | 130        | 103            |
| Total PCB                     | 2340       | 1870             | 265          | 414        | 395        | 3140           |
| oxic Equivalency - (WHO 2005) |            |                  |              |            |            |                |
| Lower Bound PCB TEQ           | 0.00644    | 0.00218          | 0.00         | 0.000542   | 0.00       | 0.0063         |
| Mid Point PCB TEQ             | 0.109      | 0.179            | 0.115        | 0.0855     | 0.116      | 0.229          |
| Upper Bound PCB TEQ           | 0.210      | 0.355            | 0.230        | 0.170      | 0.231      | 0.24           |

|                                       |                  | LS Life Sc       |               |               |                |               |
|---------------------------------------|------------------|------------------|---------------|---------------|----------------|---------------|
|                                       |                  | ple Analysis Sum |               |               |                |               |
| Sample Name                           | ENG-583-DFP-02 E | :NG-168-DFP-01   | DFP-BLANK     | ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-0 |
| ALS Sample ID                         | L2526958-7       | L2526958-8       | L2526958-9    | L2526958-10   | L2526958-11    | L2526958-     |
| Sample Size                           | 1<br>Samula      | 1<br>Samula      | 1<br>Sample   | 1<br>Cample   | 1<br>Sample    | Comp          |
| Sample size units<br>Percent Moisture | Sample<br>n/a    | Sample<br>n/a    | Sample<br>n/a | Sample<br>n/a | n/a            | Samp<br>n     |
| Sample Matrix                         | Swab             | Swab             | Swab          | Swab          | Swab           | Sw            |
| Sampling Date                         | 4-Nov-20         | 4-Nov-20         | 4-Nov-20      | 4-Nov-20      | 4-Nov-20       | 4-Nov-        |
| extraction Date                       | 25-Nov-20        | 25-Nov-20        | 25-Nov-20     | 25-Nov-20     | 25-Nov-20      | 25-Nov-       |
| arget Analytes                        | pg               | pg               | pg            | pg            | pg             | I             |
| PCB-001                               | <1.7             | <1.4             | <1.6          | <3.1          | 16.9           | <4            |
| PCB-002                               | 5.95             | <2.8             | <2.4          | <3.6          | 70.5           | 3             |
| PCB-003                               | 5.25             | 4.40             | <3.3          | <3.7          | 69.9           | <             |
| PCB-004                               | <3.9             | <3.7             | <2.7          | <12           | <12            | <.            |
| PCB-010                               | <1.3<br><1.3     | <1.1<br><1.1     | <1.8<br><1.8  | <8.3<br><8.3  | <2.9<br><3.0   | <             |
| PCB-009<br>PCB-007                    | <1.3             | 4.09             | <1.7          | <8.1          | 10.8           | <:            |
| PCB-006                               | 4.30             | <2.9             | 2.29          | <8.5          | <13            | <             |
| PCB-005                               | <1.5             | <1.3             | <2.0          | <9.6          | <3.5           | <             |
| PCB-008                               | 15.8             | 13.1             | <4.8          | <9.6          | 47.1           | 9             |
| PCB-014                               | <1.2             | <1.7             | <1.8          | <10           | <2.8           | <             |
| PCB-011                               | 1050             | 136              | 38.7          | 948           | 894            | 14            |
| PCB-012/013                           | <19              | 5.62             | <1.9          | <10           | <30            | <             |
| PCB-015<br>PCB-019                    | 17.0<br>1.83     | <13<br><0.87     | <2.2<br><0.85 | <14<br><4.9   | <42<br><3.9    | <             |
| PCB-019<br>PCB-018/030                | 11.0             | 12.1             | <0.85<br><2.5 | <4.9<br><8.4  | 32.3           | <             |
| PCB-017                               | 6.31             | 5.92             | <1.1          | <5.7          | 18.1           | 3             |
| PCB-027                               | < 0.70           | < 0.74           | <0.84         | <4.2          | <2.3           | <0            |
| PCB-024                               | < 0.61           | < 0.72           | <0.84         | <4.2          | <1.1           | <0            |
| PCB-016                               | 6.08             | 6.81             | <2.0          | <6.9          | <15            | <             |
| PCB-032                               | 3.83             | 4.45             | <1.5          | <4.0          | 10.5           | 3             |
| PCB-034                               | < 0.76           | <1.1             | <1.2          | <5.2          | <1.2           | <             |
| PCB-023<br>PCB-026/029                | <0.72<br>4.16    | <1.0<br><3.6     | <1.1<br><1.1  | <4.9<br><4.9  | <1.1<br><12    | < 3           |
| PCB-025                               | <2.1             | <2.1             | <1.0          | <4.4          | <8.5           | <             |
| PCB-031                               | 19.0             | 21.5             | 5.02          | 17.3          | 62.7           | 1             |
| PCB-020/028                           | 22.6             | 26.5             | <5.3          | <4.8          | 78.9           | 1             |
| PCB-021/033                           | <14              | 18.1             | <2.7          | <4.7          | <50            | <             |
| PCB-022                               | 9.91             | 10.8             | 2.28          | <5.1          | 32.4           | 5             |
| PCB-036                               | <2.9             | <1.0             | <1.1          | <4.8          | 16.6           | <             |
| PCB-039<br>PCB-038                    | <0.73<br><0.79   | <1.0<br><1.1     | <1.1<br><1.2  | <4.9<br><5.3  | <1.1<br><1.2   | <             |
| PCB-035                               | 23.3             | <3.8             | <1.3          | <7.4          | 42.9           | 1             |
| PCB-037                               | 16.4             | 17.0             | <1.8          | 17.3          | 67.7           | 6             |
| PCB-054                               | < 0.42           | < 0.48           | <0.58         | <2.0          | < 0.49         | <0            |
| PCB-050/053                           | 2.14             | <2.5             | <1.1          | <2.9          | 8.55           | <             |
| PCB-045/051                           | 12.0             | 10.3             | <1.1          | <3.0          | 71.3           | <             |
| PCB-046                               | 1.38             | <0.85            | <1.3          | <3.5          | <3.9           | <             |
| PCB-052                               | 55.2             | 110              | <1.1          | 26.2          | 270            | 2             |
| PCB-073<br>PCB-043                    | <0.66<br><1.3    | <0.56<br><0.97   | <0.85<br><1.5 | <2.3<br><4.0  | <0.56<br><2.1  | <0            |
| PCB-043<br>PCB-049/069                | <1.5             | 27.1             | <1.5          | <8.6          | 79.7           | 7             |
| PCB-048                               | 4.04             | <5.4             | <1.2          | <3.1          | 18.6           | 1             |
| PCB-044/047/065                       | 81.6             | 95.7             | <4.6          | 20.3          | 506            | 2             |
| PCB-059/062/075                       | <1.6             | <2.0             | <0.88         | <2.4          | 10.6           | <0            |
| PCB-042                               | <5.4             | 9.36             | <1.3          | <3.6          | <25            | <             |
| PCB-040/041/071<br>PCB-064            | 14.2             | 19.6             | <1.2          | 9.92          | 60.8           | <             |
| PCB-064<br>PCB-072                    | 13.6<br><0.91    | 22.6<br><0.99    | 1.26<br><0.99 | 8.37<br><2.9  | 61.2<br><1.1   | <0            |
| PCB-072<br>PCB-068                    | 7.74             | <5.1             | <0.99         | <2.7          | 50.1           | 4             |
| PCB-057                               | <0.97            | <1.1             | <1.1          | <3.1          | <1.2           | <0            |
| PCB-058                               | <0.89            | < 0.97           | < 0.97        | <2.8          | <1.1           | <0            |
| PCB-067                               | < 0.81           | <0.89            | <0.89         | <2.6          | <2.9           | <0            |
| PCB-063                               | <0.90            | <0.98            | <0.98         | <2.9          | <4.8           | <0            |
| PCB-061/070/074/076                   | 90.5             | 150              | <3.0          | 54.5          | 419            | 3             |
| PCB-066<br>PCB-055                    | 31.4<br><0.99    | 49.2<br><1.1     | <1.3<br><1.1  | 23.1<br><3.2  | 144<br><1.2    | <0            |
| PCB-055<br>PCB-056                    | 23.0             | <1.1<br><19      | <2.0          | <3.2<br><15   | 62.5           | <0            |
| PCB-050                               | 11.1             | 13.0             | <1.1          | 9.44          | 38.0           | 3             |
| PCB-080                               | <0.85            | < 0.93           | <0.93         | <2.7          | <1.0           | <0            |
| PCB-079                               | <1.7             | <2.6             | <0.99         | <2.9          | <6.5           | <0            |
| PCB-078                               | <1.1             | <1.2             | <1.2          | <3.4          | <1.8           | <0            |
| PCB-081                               | <1.1             | <1.3             | <1.3          | <3.3          | <1.4           | <0            |
| PCB-077                               | 16.1             | <9.5             | <1.4          | <8.7          | 47.1           | </td          |
| PCB-104                               | < 0.73           | <0.69            | <0.70         | <2.5          | < 0.63         | <0            |
| PCB-096<br>PCB-103                    | <0.71<br><1.6    | <1.2<br><1.5     | <0.71<br><1.1 | <2.1<br><3.4  | 2.54<br>2.39   | <0            |
| PCB-103                               | <1.9             | <1.8             | <1.3          | <3.9          | <2.2           | <             |
| PCB-095                               | 85.7             | 172              | <1.3          | 26.3          | 475            | 3             |
| PCB-093/098/100/102                   | 4.68             | 6.68             | <1.2          | <3.7          | 17.3           | <:            |

|                                       |                | LS Life Sc       |                |               |                |              |
|---------------------------------------|----------------|------------------|----------------|---------------|----------------|--------------|
|                                       | Sam            | ple Analysis Sum | mary Report    |               |                |              |
| Sample Name                           | ENG-583-DFP-02 | ENG-168-DFP-01   | DFP-BLANK      | ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP- |
| ALS Sample ID                         | L2526958-7     | L2526958-8       | L2526958-9     | L2526958-10   | L2526958-11    | L2526958     |
| Sample Size                           | 1              | 1                | 1              | 1             | 1              | _            |
| Sample size units<br>Percent Moisture | Sample<br>n/a  | Sample<br>n/a    | Sample<br>n/a  | Sample<br>n/a | Sample<br>n/a  | Sam          |
| Sample Matrix                         | Swab           | Swab             | Swab           | Swab          | Swab           | Sw           |
| ampling Date                          | 4-Nov-20       | 4-Nov-20         | 4-Nov-20       | 4-Nov-20      | 4-Nov-20       | 4-Nov-       |
| xtraction Date                        | 25-Nov-20      | 25-Nov-20        | 25-Nov-20      | 25-Nov-20     | 25-Nov-20      | 25-Nov-      |
| arget Analytes                        | pg             | pg               | pg             | pg            | pg             |              |
| PCB-088/091                           | 15.9           | 26.4             | <1.2           | <3.8          | 71.7           | 6            |
| PCB-084                               | 33.4           | 62.6             | <1.4           | <10           | 163            | 1            |
| PCB-089                               | <2.1           | <2.0             | <1.4           | <4.3          | <5.2           | <            |
| PCB-121                               | <1.4           | <1.3             | <0.91          | <2.8          | <1.6           | <            |
| PCB-092<br>PCB-090/101/113            | 24.9<br>144    | 43.1<br>242      | <1.3<br>2.25   | <4.2<br>47.7  | 112<br>657     | 1            |
| PCB-083/099                           | 107            | 117              | <1.3           | 26.5          | 331            | 3            |
| PCB-112                               | <17            | <1.4             | < 0.96         | <3.0          | <7.4           | <            |
| PCB-086/087/097/109/119/125           | 119            | 172              | <1.1           | 45.2          | 491            | 5            |
| PCB-085/110/115/116/117               | 266            | 328              | <2.5           | 96.7          | 934            |              |
| PCB-082                               | <24            | 28.3             | <1.8           | <12           | 87.8           | <            |
| PCB-111                               | <1.5           | <1.4             | <0.98          | <3.1          | <1.6           | <            |
| PCB-120                               | <1.5<br>7.13   | <1.4<br><8.1     | <0.98          | <3.0          | <1.6           | 1            |
| PCB-108/124<br>PCB-107                | 7.13<br>9.48   | <8.1<br><9.9     | <1.2<br><1.1   | <4.3<br><5.8  | 23.7<br>30.6   | <            |
| PCB-107<br>PCB-123                    | <2.8           | 2.61             | <1.1           | <5.8<br><4.4  | 10.1           | •            |
| PCB-123                               | <2.2           | <2.0             | <1.3           | <4.5          | <2.1           | `            |
| PCB-118                               | 165            | 196              | <1.3           | 89.4          | 524            |              |
| PCB-122                               | <2.3           | <2.1             | <1.4           | <4.8          | <8.5           | <            |
| PCB-114                               | <3.2           | 5.73             | <1.3           | <4.2          | <11            | <            |
| PCB-105                               | 63.0           | 68.7             | <1.4           | <33           | 182            | :            |
| PCB-127                               | <2.3           | <2.1             | <1.3           | <4.7          | <2.2           | <            |
| PCB-126                               | <2.7           | <2.6             | <1.7           | <7.6          | <9.3           | <            |
| PCB-155                               | <0.54          | < 0.72           | <0.44          | <2.3          | <1.1           | <(           |
| PCB-152<br>PCB-150                    | <0.38<br><0.36 | <0.45<br><0.43   | <0.53<br><0.51 | <1.2<br><1.1  | <0.55<br>0.668 | <(<br><(     |
| PCB-136                               | <17            | 30.5             | <0.55          | <6.2          | 61.2           |              |
| PCB-145                               | <0.39          | < 0.47           | <0.55          | <1.2          | <0.51          | <(           |
| PCB-148                               | <0.55          | <0.66            | <0.78          | <1.7          | < 0.71         | <(           |
| PCB-135/151                           | 45.2           | 61.0             | <0.83          | 20.5          | 139            | :            |
| PCB-154                               | <0.72          | < 0.54           | < 0.65         | <1.4          | <0.58          | <(           |
| PCB-144                               | <6.6           | 10.5             | <0.84          | 3.21          | 22.3           | 3            |
| PCB-147/149                           | 158            | 190              | <1.9           | 66.0          | 353            |              |
| PCB-134/143                           | <10            | <12              | <0.97          | <6.5          | 31.5           | !            |
| PCB-139/140                           | 4.13           | <5.3<br><4.3     | <0.80          | < 5.4         | 10.6<br>8.92   | <            |
| PCB-131<br>PCB-142                    | <2.9<br><1.5   | <4.3<br><1.3     | <1.0<br><0.97  | <6.7<br><6.5  | <1.3           | •            |
| PCB-132                               | 76.9           | 84.6             | <0.96          | <30           | 177            |              |
| PCB-133                               | <1.9           | <1.9             | <0.92          | <6.2          | 5.15           |              |
| PCB-165                               | <1.1           | <0.93            | < 0.71         | <4.8          | <0.96          |              |
| PCB-146                               | 21.9           | 22.0             | <0.80          | 14.5          | <46            |              |
| PCB-161                               | <1.1           | < 0.89           | <0.68          | <4.6          | <0.92          | <            |
| PCB-153/168                           | 135            | 134              | 1.73           | 79.0          | 297            | •            |
| PCB-141                               | 40.0           | 38.5             | <0.93          | <21           | 75.5           |              |
| PCB-130                               | <14            | 15.6             | <1.1           | 10.1          | <24            |              |
| PCB-137/164<br>PCB-129/138/163        | 26.8<br>234    | 26.3<br>208      | <0.81<br><1.3  | <14<br>127    | 48.9<br>454    | ;            |
| PCB-129/138/163<br>PCB-160            | <1.2           | <0.98            | <0.75          | <5.0          | <0.93          | <            |
| PCB-158                               | 22.0           | 21.1             | < 0.61         | <13           | <42            |              |
| PCB-128/166                           | 33.8           | 27.1             | <0.83          | 20.7          | 63.2           | :            |
| PCB-159                               | 1.40           | <1.0             | < 0.71         | <4.8          | <2.0           |              |
| PCB-162                               | <1.2           | <0.98            | <0.74          | <5.0          | <1.0           | <            |
| PCB-167                               | <7.5           | <4.2             | <0.65          | 5.41          | 15.2           | •            |
| PCB-156/157                           | 17.0           | 14.3             | <0.90          | 13.4          | 37.9           |              |
| PCB-169<br>PCB-188                    | <1.0           | <0.84<br><0.93   | <0.79<br><0.54 | <4.0<br><2.9  | <1.1<br><0.55  | <            |
| PCB-188<br>PCB-179                    | <1.2<br><9.1   | <0.93<br>14.2    | <0.54<br><0.59 | <2.9<br><6.1  | <0.55<br>25.3  | (            |
| PCB-179                               | <0.94          | < 0.66           | <0.53          | <1.8          | 1.70           | <(           |
| PCB-176                               | 3.93           | 3.72             | <0.60          | <2.1          | 8.24           | 2            |
| PCB-186                               | <1.1           | <0.77            | <0.61          | <2.1          | <0.52          | <            |
| PCB-178                               | <6.6           | <4.8             | <0.90          | <3.2          | 12.5           | 3            |
| PCB-175                               | <1.6           | <1.1             | < 0.90         | <3.1          | 3.57           | <            |
| PCB-187                               | 38.8           | 36.2             | <0.77          | 32.7          | 73.7           | 2            |
| PCB-182                               | <1.5           | <1.1             | <0.84          | <2.9          | < 0.71         | <            |
| PCB-183                               | 16.9           | 13.5             | <0.84          | <8.5          | 35.0           |              |
| PCB-185                               | 2.86           | <1.6             | <0.86          | <3.0          | 5.25           | <            |
| PCB-174                               | 29.2           | <23              | <0.91          | <21           | 50.3           | 2            |
| PCB-177                               | <13            | 14.7             | <0.96          | 13.9          | 28.2           | 1            |
| PCB-181                               | <1.6           | <1.1             | <0.90          | <3.2          | <1.0           | <            |
| PCB-171/173<br>PCB-172                | <8.5<br>9.11   | 9.55<br><2.9     | <0.99<br><0.99 | 10.0<br><3.6  | 17.0<br><8.6   | <            |

|                                |                       | ALS Life So           | iences                |                       |                       |                   |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------|
| Sample Analysis Summary Report |                       |                       |                       |                       |                       |                   |
| Sample Name                    | ENG-583-DFP-02        | ENG-168-DFP-01        | DFP-BLANK             | ENG-159-DFP-1         | ENG-583-DFP-01        | ENG-558-DFP-0     |
| .LS Sample ID                  | L2526958-7            | L2526958-8            | L2526958-9            | L2526958-10           | L2526958-11           | L2526958-         |
| ample Size                     | 1                     | 1                     | 1                     | 1                     | 1                     |                   |
| ample size units               | Sample                | Sample                | Sample                | Sample                | Sample                | Samp              |
| ercent Moisture                | n/a                   | n/a                   | n/a                   | n/a                   | n/a                   | 1                 |
| ample Matrix                   | Swab                  | Swab                  | Swab                  | Swab                  | Swab                  | Sw                |
| ampling Date<br>xtraction Date | 4-Nov-20<br>25-Nov-20 | 4-Nov-20<br>25-Nov-20 | 4-Nov-20<br>25-Nov-20 | 4-Nov-20<br>25-Nov-20 | 4-Nov-20<br>25-Nov-20 | 4-Nov-<br>25-Nov- |
| traction Date                  | 25 1107 20            | 25 1404 20            | 25-1404-20            | 25 1104-20            | 25-1404-20            | 25-1104-          |
| rget Analytes                  | pg                    | pg                    | pg                    | pg                    | pg                    |                   |
| PCB-192                        | <1.4                  | <0.95                 | < 0.76                | <2.7                  | <0.68                 | <                 |
| PCB-180/193                    | 64.8                  | 53.6                  | <0.75                 | <63                   | 115                   | 2                 |
| PCB-191                        | <2.3                  | <1.4                  | <0.64                 | <2.3                  | <3.3                  | <                 |
| PCB-170                        | 20.5                  | 17.9                  | <0.75                 | 22.2                  | 50.6                  | 3                 |
| PCB-190                        | <3.1                  | 2.96                  | < 0.47                | 3.92                  | 11.2                  | 5                 |
| PCB-189                        | < 0.60                | < 0.69                | < 0.50                | <1.1                  | <1.9                  | <                 |
| PCB-202<br>PCB-201             | <7.4<br><2.8          | 9.47<br>2.62          | <0.88<br><0.90        | 7.83<br><2.5          | 18.5<br>5.88          | <                 |
| PCB-201<br>PCB-204             | <0.87                 | <0.90                 | <0.90                 | <2.5                  | <0.71                 |                   |
| PCB-204<br>PCB-197             | <0.85                 | <0.90<br><0.88        | <0.90<br><0.88        | <2.5<br><2.5          | <1.0                  | <                 |
| PCB-197                        | <1.7                  | <2.6                  | <0.92                 | <2.6                  | 6.09                  | <                 |
| PCB-198/199                    | 14.8                  | 12.9                  | < 0.88                | 20.2                  | 47.0                  | 1                 |
| PCB-196                        | <4.3                  | <4.0                  | <0.86                 | 6.35                  | 15.1                  | 6                 |
| PCB-203                        | 10.1                  | <7.2                  | < 0.85                | 9.06                  | 30.5                  | <                 |
| PCB-195                        | 3.17                  | 3.21                  | <0.71                 | <3.0                  | 8.84                  | 4                 |
| PCB-194                        | 14.0                  | 12.2                  | <1.5                  | 14.2                  | 28.8                  | 1                 |
| PCB-205                        | <0.76                 | <0.84                 | <0.68                 | <1.6                  | <1.6                  | <                 |
| PCB-208                        | 9.77                  | 7.88                  | <1.6                  | 23.0                  | 21.9                  | <                 |
| PCB-207                        | <5.0                  | <2.7                  | <1.7                  | <11                   | 8.07                  | 4                 |
| PCB-206                        | 16.6                  | <10                   | 4.75                  | 31.9                  | 53.4                  | <                 |
| PCB-209                        | 141                   | 133                   | 59.5                  | <5300                 | 89.4                  | 2                 |
| Extraction Standards           | % Rec                 | % R               |
| 13C12-PCB-001                  | 57                    | 74                    | 54                    | 51                    | 67                    |                   |
| 13C12-PCB-003                  | 59                    | 71                    | 53                    | 44                    | 60                    |                   |
| 13C12-PCB-004                  | 65                    | 79                    | 61                    | 54                    | 69                    |                   |
| 13C12-PCB-015                  | 55                    | 64                    | 53                    | 49                    | 64                    |                   |
| 13C12-PCB-019                  | 69                    | 80                    | 64                    | 63                    | 79                    |                   |
| 13C12-PCB-037                  | 62                    | 72                    | 57                    | 54                    | 74                    |                   |
| 13C12-PCB-054                  | 77                    | 89                    | 73                    | 65                    | 84                    |                   |
| 13C12-PCB-081                  | 69                    | 83                    | 67                    | 68                    | 82                    |                   |
| 13C12-PCB-077                  | 67<br>82              | 81<br>100             | 66<br>84              | 66<br>71              | 78<br>95              |                   |
| 13C12-PCB-104<br>13C12-PCB-123 | 82<br>66              | 82                    | 84<br>66              | 71<br>75              | 95<br>78              |                   |
| 13C12-PCB-123<br>13C12-PCB-118 | 66                    | 82<br>80              | 66                    | 75<br>73              | 78<br>76              |                   |
| 13C12-PCB-118<br>13C12-PCB-114 | 70                    | 80<br>85              | 68                    | 73<br>77              | 80                    |                   |
| 13C12-PCB-114<br>13C12-PCB-105 | 69                    | 84                    | 69                    | 78                    | 81                    |                   |
| 13C12-PCB-105                  | 65                    | 77                    | 64                    | 76<br>75              | 78                    |                   |
| 13C12-PCB-155                  | 38                    | 40                    | 71                    | 34                    | 76                    |                   |
| 13C12-PCB-167                  | 72                    | 89                    | 76                    | 79                    | 86                    |                   |
| 13C12-PCB-156/157              | 73                    | 91                    | 77                    | 82                    | 88                    |                   |
| 13C12-PCB-169                  | 78                    | 96                    | 78                    | 93                    | 95                    |                   |
| 13C12-PCB-188                  | 52                    | 55                    | 85                    | 45                    | 89                    |                   |
| 13C12-PCB-189                  | 71                    | 91                    | 74                    | 90                    | 92                    |                   |
| 13C12-PCB-202                  | 49                    | 55                    | 76                    | 53                    | 81                    |                   |
| 13C12-PCB-205                  | 95                    | 125                   | 90                    | 100                   | 111                   |                   |
| 13C12-PCB-208                  | 40                    | 44                    | 74                    | 38                    | 82                    |                   |
| 13C12-PCB-206                  | 80                    | 106                   | 89                    | 91                    | 99                    |                   |
| 13C12-PCB-209                  | 25                    | 29                    | 62                    | 0                     | 70                    |                   |
| Cleanup Standards              |                       |                       |                       |                       |                       |                   |
| 13C12-PCB-028                  | 67                    | 75                    | 64                    | 66                    | 76                    |                   |
| 13C12-PCB-111                  | 69                    | 82                    | 72                    | 83                    | 84                    |                   |
| 13C12-PCB-178                  | 74                    | 89                    | 83                    | 86                    | 92                    |                   |

| ALS Life Sciences              |                |                |            |               |                |               |  |
|--------------------------------|----------------|----------------|------------|---------------|----------------|---------------|--|
| Sample Analysis Summary Report |                |                |            |               |                |               |  |
| Sample Name                    | ENG-583-DFP-02 | ENG-168-DFP-01 | DFP-BLANK  | ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-0 |  |
| ALS Sample ID                  | L2526958-7     | L2526958-8     | L2526958-9 | L2526958-10   | L2526958-11    | L2526958-1    |  |
| Sample Size                    | 1              | 1              | 1          | 1             | 1              |               |  |
| Sample size units              | Sample         | Sample         | Sample     | Sample        | Sample         | Sampl         |  |
| Percent Moisture               | n/a            | n/a            | n/a        | n/a           | n/a            | n/            |  |
| Sample Matrix                  | Swab           | Swab           | Swab       | Swab          | Swab           | Swa           |  |
| Sampling Date                  | 4-Nov-20       | 4-Nov-20       | 4-Nov-20   | 4-Nov-20      | 4-Nov-20       | 4-Nov-2       |  |
| Extraction Date                | 25-Nov-20      | 25-Nov-20      | 25-Nov-20  | 25-Nov-20     | 25-Nov-20      | 25-Nov-2      |  |
| Target Analytes                | pg             | pg             | pg         | pg            | pg             | р             |  |
| Homologue Group Totals         |                |                |            |               |                |               |  |
| Total MonoCB                   | 12.9           | 7.20           | 5.70       | <3.1          | 157            | 55.           |  |
| Total DiCB                     | 1110           | 178            | 45.8       | 958           | 1050           | 141           |  |
| Total TriCB                    | 144            | 133            | 23.1       | 50.4          | 454            | 77.           |  |
| Total TetraCB                  | 389            | 553            | 13.4       | 184           | 1890           | 15            |  |
| Total PentaCB                  | 1090           | 1490           | 6.05       | 400           | 4160           | 47            |  |
| Total HexaCB                   | 877            | 912            | 4.93       | 444           | 1920           | 40            |  |
| Total HeptaCB                  | 229            | 200            | < 0.47     | 185           | 452            | 33            |  |
| Total OctaCB                   | 58.3           | 54.2           | 1.50       | 60.6          | 163            | 56.           |  |
| Total NonaCB                   | 31.4           | 20.6           | 4.75       | 65.9          | 83.4           | 30.           |  |
| DecaCB                         | 141            | 133            | 59.5       | <5300         | 89.4           | 21            |  |
| Total PCB                      | 4080           | 3680           | 165        | 2350          | 10400          | 322           |  |
| oxic Equivalency - (WHO 2005)  |                |                |            |               |                |               |  |
| Lower Bound PCB TEQ            | 0.00896        | 0.00862        | 0.00       | 0.00325       | 0.0278         | 0.0015        |  |
| Mid Point PCB TEQ              | 0.160          | 0.153          | 0.0972     | 0.826         | 0.975          | 0.31          |  |
| Upper Bound PCB TEQ            | 0.310          | 0.295          | 0.194      | 0.886         | 0.992          | 0.63          |  |

|                           | ALS Life          | Sciences       |  |
|---------------------------|-------------------|----------------|--|
|                           | Quality Control S | Summary Report |  |
| Sample Name               | Method Blank      | Method Blank   |  |
|                           |                   |                |  |
| ALS Sample ID Sample Size | WG3440853-1       | WG3440853-4    |  |
| Sample size units         | Blank             | Blank          |  |
| Percent Moisture          | n/a               | n/a            |  |
| Sample Matrix             | Swab              | Reagent        |  |
| Sampling Date             | n/a               | n/a            |  |
| Extraction Date           | 25-Nov-20         | 25-Nov-20      |  |
| Target Analytes           | pg                | pg             |  |
| PCB-001                   | 2.60              | <1.1           |  |
| PCB-002                   | <3.4              | <2.0           |  |
| PCB-003<br>PCB-004        | <4.6<br><4.3      | <2.5<br><2.5   |  |
| PCB-0004<br>PCB-010       | <2.8              | <1.7           |  |
| PCB-010                   | <2.8              | <1.7           |  |
| PCB-007                   | <2.8              | <1.7           |  |
| PCB-006                   | <2.9              | <1.7           |  |
| PCB-005                   | <3.3              | <1.9           |  |
| PCB-008                   | 5.96              | <3.5           |  |
| PCB-014                   | <2.2              | <1.8           |  |
| PCB-011                   | <27               | 22.7           |  |
| PCB-012/013               | <2.2              | <1.9           |  |
| PCB-015<br>PCB-019        | <2.6              | <2.3<br><0.92  |  |
| PCB-019<br>PCB-018/030    | <1.3<br>3.27      | <0.92<br><0.94 |  |
| PCB-017                   | <2.0              | <1.1           |  |
| PCB-027                   | <1.2              | <0.82          |  |
| PCB-024                   | <1.2              | <0.82          |  |
| PCB-016                   | <1.9              | <1.3           |  |
| PCB-032                   | <1.2              | <0.77          |  |
| PCB-034                   | <1.7              | <1.0           |  |
| PCB-023                   | <1.6              | < 0.94         |  |
| PCB-026/029               | <1.6              | <0.94          |  |
| PCB-025                   | <1.4              | <0.85          |  |
| PCB-031<br>PCB-020/028    | 5.93<br><1.6      | 3.65<br><0.93  |  |
| PCB-021/033               | <3.3              | <1.9           |  |
| PCB-022                   | <1.7              | 2.34           |  |
| PCB-036                   | <1.6              | <0.94          |  |
| PCB-039                   | <1.6              | < 0.96         |  |
| PCB-038                   | <1.8              | <1.0           |  |
| PCB-035                   | <1.8              | <1.1           |  |
| PCB-037                   | <2.5              | 1.81           |  |
| PCB-054                   | <0.66             | <0.39          |  |
| PCB-050/053               | <1.2              | <0.78          |  |
| PCB-045/051<br>PCB-046    | 1.48              | < 0.81         |  |
| PCB-046<br>PCB-052        | <1.4<br>2.96      | <0.94<br>3.01  |  |
| PCB-052<br>PCB-073        | <0.93             | <0.62          |  |
| PCB-073                   | <1.6              | <1.1           |  |
| PCB-049/069               | <1.3              | <1.3           |  |
| PCB-048                   | <1.3              | <0.84          |  |
| PCB-044/047/065           | 5.13              | <4.4           |  |
| PCB-059/062/075           | <0.97             | <0.64          |  |
| PCB-042                   | <1.5              | <0.97          |  |
| PCB-040/041/071           | 1.36              | <0.89          |  |
| PCB-064                   | <1.0              | 1.16           |  |
| PCB-072                   | <1.4              | <0.69          |  |
| PCB-068<br>PCB-057        | <1.3<br><1.5      | <0.65<br><0.73 |  |
| PCB-057<br>PCB-058        | <1.4              | <0.67          |  |
| PCB-067                   | <1.3              | <0.61          |  |
| PCB-063                   | <1.4              | <0.68          |  |
| PCB-061/070/074/076       | <2.8              | <3.4           |  |
| PCB-066                   | <1.4              | <0.80          |  |
| PCB-055                   | <1.5              | <0.75          |  |
| PCB-056                   | 1.89              | <0.78          |  |
| PCB-060                   | <1.5              | <0.74          |  |
| PCB-080                   | <1.3              | <0.65          |  |
| PCB-079                   | <1.4              | < 0.68         |  |
| PCB-078                   | <1.7              | <0.81          |  |
| PCB-081<br>PCB-077        | <1.9<br><2.1      | <0.89<br><0.94 |  |
| PCB-077<br>PCB-104        | <2.1<br><0.94     | <0.75          |  |
| PCB-104<br>PCB-096        | <1.0              | <0.70          |  |
| PCB-090                   | <1.7              | <0.96          |  |
| PCB-094                   | <1.9              | <1.1           |  |
| PCB-095                   | <1.8              | <1.0           |  |
| PCB-093/098/100/102       | <1.8              | <1.1           |  |

|                                        | ALS Life      | Sciences       |
|----------------------------------------|---------------|----------------|
|                                        |               | Summary Report |
| Sample Name                            | Method Blank  | Method Blank   |
|                                        |               |                |
| ALS Sample ID                          | WG3440853-1   | WG3440853-4    |
| Sample Size                            | 1             | 1              |
| Sample size units Percent Moisture     | Blank<br>n/a  | Blank<br>n/a   |
| Sample Matrix                          | Swab          | Reagent        |
| Sampling Date                          | n/a           | n/a            |
| Extraction Date                        | 25-Nov-20     | 25-Nov-20      |
| Target Analytes                        | pg            | pg             |
| PCB-088/091                            | <1.9          | <1.1           |
| PCB-084                                | <2.1          | <1.2           |
| PCB-089<br>PCB-121                     | <2.1<br><1.4  | <1.2<br><0.81  |
| PCB-092                                | <2.1          | <1.2           |
| PCB-090/101/113                        | 3.82          | 1.94           |
| PCB-083/099                            | <2.1          | <1.2           |
| PCB-112<br>PCB-086/087/097/109/119/125 | <1.5<br><1.8  | <0.85<br><1.0  |
| PCB-085/110/115/116/117                | <1.7          | 2.93           |
| PCB-082                                | <2.7          | <1.6           |
| PCB-111                                | <1.5          | <0.87          |
| PCB-120<br>PCB-108/124                 | <1.5<br><1.7  | <0.87<br><1.1  |
| PCB-103/124                            | <1.5          | <1.0           |
| PCB-123                                | <2.0          | <1.2           |
| PCB-106                                | <1.8          | <1.2           |
| PCB-118<br>PCB-122                     | <1.8<br><1.9  | <1.2<br><1.3   |
| PCB-114                                | <1.9          | <1.2           |
| PCB-105                                | <1.9          | <1.3           |
| PCB-127                                | <1.9          | <1.3           |
| PCB-126<br>PCB-155                     | <2.4<br><1.2  | <1.5<br><0.67  |
| PCB-155                                | <0.76         | <0.49          |
| PCB-150                                | <0.73         | <0.47          |
| PCB-136                                | <0.79         | <0.51          |
| PCB-145<br>PCB-148                     | <0.80<br><1.1 | <0.51<br><0.72 |
| PCB-135/151                            | <1.2          | <0.77          |
| PCB-154                                | <0.93         | <0.60          |
| PCB-144                                | <1.2          | <0.78          |
| PCB-147/149<br>PCB-134/143             | 4.64<br><1.5  | <1.4<br><1.4   |
| PCB-134/143<br>PCB-139/140             | <1.5          | <1.4           |
| PCB-131                                | <1.6          | <1.5           |
| PCB-142                                | <1.5          | <1.4           |
| PCB-132                                | <1.5          | <1.4           |
| PCB-133<br>PCB-165                     | <1.4<br><1.1  | <1.4<br><1.0   |
| PCB-146                                | <1.3          | <1.2           |
| PCB-161                                | <1.1          | <1.0           |
| PCB-153/168                            | 4.17          | 1.81           |
| PCB-141<br>PCB-130                     | <1.5<br><1.7  | <1.4<br><1.7   |
| PCB-137/164                            | <1.3          | <1.2           |
| PCB-129/138/163                        | 2.90          | <2.6           |
| PCB-160                                | <1.2          | <1.1           |
| PCB-158<br>PCB-128/166                 | <0.95<br><1.3 | <0.90<br><1.2  |
| PCB-128/100                            | <1.1          | <1.1           |
| PCB-162                                | <1.2          | <1.1           |
| PCB-167                                | <0.88         | <0.88          |
| PCB-156/157<br>PCB-169                 | 1.57<br><1.1  | <1.2<br><0.99  |
| PCB-169                                | <1.5          | <0.69          |
| PCB-179                                | <1.2          | < 0.63         |
| PCB-184                                | <1.1          | <0.57          |
| PCB-176<br>PCB-186                     | <1.2<br><1.2  | <0.64<br><0.66 |
| PCB-178                                | <1.8          | <0.97          |
| PCB-175                                | <1.8          | <0.97          |
| PCB-187                                | 2.24          | <0.82          |
| PCB-182<br>PCB-183                     | <1.7<br><1.7  | <0.90<br><0.91 |
| PCB-183                                | <1.7          | <0.91          |
| PCB-174                                | <1.8          | <0.98          |
| PCB-177                                | <1.9          | <1.0           |
| PCB-181<br>PCB-171/173                 | <1.8<br><2.0  | <0.97<br><1.1  |
| PCB-171/173<br>PCB-172                 | <2.0<br><2.0  | <1.1<br><1.1   |

| Cample Name      |                      | ALS Life        | Sciences       |  |
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| LLS Sample ID WG3440853-1 WG3440853-4 sample Size 1 1 1 1 1 sample Size 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      | Quality Control | Summary Report |  |
| Cample Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ample Name           | Method Blank    | Method Blank   |  |
| Cample Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                 |                |  |
| ample Size 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                 |                |  |
| Sample Size units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                 |                |  |
| recent Molsture implies the complete implies the co |                      |                 |                |  |
| Pample Mark      |                      |                 |                |  |
| PCB-192   CF-Nov-20   PCB-192   PCB-192   CF-Nov-20   PCB-192   CF-Nov-20   PCB-192   CF-Nov-20   PCB-192   CF-Nov-20   PCB-191   CF-Nov-20   CF-Nov   |                      |                 |                |  |
| PCB-192                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-192                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ktraction Date       | 25-Nov-20       | 25-Nov-20      |  |
| PCB-180/193                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | arget Analytes       | pg              | pg             |  |
| PCB-180/193                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-192              | <1.5            | <0.82          |  |
| PCB-170                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-191              | <1.3            | < 0.69         |  |
| PCB-189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-170              | <1.5            | <0.80          |  |
| PCB-201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-190              | < 0.94          | < 0.50         |  |
| PCB-201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-204                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-197                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-198/199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                 |                |  |
| PCB-196       <1.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                 |                |  |
| PCB-203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-195       <1.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                 |                |  |
| PCB-194                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| PCB-205       < 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                 |                |  |
| PCB-208       <3.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                 |                |  |
| PCB-206       <3.3       <2.7         PCB-209       270       112         Extraction Standards       % Rec       % Rec         13C12-PCB-001       64       55         13C12-PCB-003       56       54         13C12-PCB-0015       63       62         13C12-PCB-015       56       54         13C12-PCB-019       63       59         13C12-PCB-037       58       59         13C12-PCB-054       78       72         13C12-PCB-081       70       69         13C12-PCB-107       67       69         13C12-PCB-114       91       81         13C12-PCB-118       68       68         13C12-PCB-114       70       70         13C12-PCB-126       66       66         13C12-PCB-155       33       41         13C12-PCB-156       77       76         13C12-PCB-167       77       78         13C12-PCB-169       78       81         13C12-PCB-188       47       59         13C12-PCB-189       76       77         13C12-PCB-189       76       77         13C12-PCB-189       76       77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      | <3.7            |                |  |
| PCB-209         270         112           Extraction Standards         % Rec         % Rec           13C12-PCB-001         64         55           13C12-PCB-003         56         54           13C12-PCB-0014         63         62           13C12-PCB-015         56         54           13C12-PCB-019         63         59           13C12-PCB-037         58         59           13C12-PCB-0544         78         72           13C12-PCB-081         70         69           13C12-PCB-104         91         81           13C12-PCB-1104         91         81           13C12-PCB-118         68         68           13C12-PCB-114         70         70           13C12-PCB-105         70         71           13C12-PCB-1155         33         41           13C12-PCB-156/157         77         78           13C12-PCB-169         78         81           13C12-PCB-188         47         59           13C12-PCB-189         76         77           13C12-PCB-1209         52         62           13C12-PCB-205         89         91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      | <3.0            |                |  |
| Extraction Standards         % Rec         % Rec           13C12-PCB-001         64         55           13C12-PCB-003         56         54           13C12-PCB-004         63         62           13C12-PCB-015         56         54           13C12-PCB-019         63         59           13C12-PCB-037         58         59           13C12-PCB-054         78         72           13C12-PCB-081         70         69           13C12-PCB-077         67         69           13C12-PCB-1104         91         81           13C12-PCB-123         67         67           13C12-PCB-118         68         68           13C12-PCB-114         70         70           13C12-PCB-126         66         66           13C12-PCB-155         33         41           13C12-PCB-156/157         77         76           13C12-PCB-169         78         81           13C12-PCB-188         47         59           13C12-PCB-189         76         77           13C12-PCB-128         47         59           13C12-PCB-129         52         62           13C12-PCB-202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PCB-206              | <3.3            | <2.7           |  |
| 13C12-PCB-001       64       55         13C12-PCB-003       56       54         13C12-PCB-0104       63       62         13C12-PCB-015       56       54         13C12-PCB-019       63       59         13C12-PCB-037       58       59         13C12-PCB-054       78       72         13C12-PCB-081       70       69         13C12-PCB-077       67       69         13C12-PCB-1123       67       67         13C12-PCB-118       68       68         13C12-PCB-118       68       68         13C12-PCB-114       70       70         13C12-PCB-126       66       66         13C12-PCB-155       33       41         13C12-PCB-156       77       76         13C12-PCB-167       77       78         13C12-PCB-169       78       81         13C12-PCB-188       47       59         13C12-PCB-189       76       77         13C12-PCB-129       52       62         13C12-PCB-205       89       91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PCB-209              | 270             | 112            |  |
| 13C12-PCB-003     56     54       13C12-PCB-004     63     62       13C12-PCB-015     56     54       13C12-PCB-019     63     59       13C12-PCB-037     58     59       13C12-PCB-054     78     72       13C12-PCB-081     70     69       13C12-PCB-077     67     69       13C12-PCB-104     91     81       13C12-PCB-1123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-156/157     77     76       13C12-PCB-156/157     77     78       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-1202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Extraction Standards | % Rec           | % Rec          |  |
| 13C12-PCB-004     63     62       13C12-PCB-015     56     54       13C12-PCB-019     63     59       13C12-PCB-037     58     59       13C12-PCB-054     78     72       13C12-PCB-081     70     69       13C12-PCB-077     67     69       13C12-PCB-1104     91     81       13C12-PCB-123     67     67       13C12-PCB-118     68     68       13C12-PCB-116     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-156/157     77     76       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 13C12-PCB-001        | 64              | 55             |  |
| 13C12-PCB-015     56     54       13C12-PCB-019     63     59       13C12-PCB-037     58     59       13C12-PCB-054     78     72       13C12-PCB-081     70     69       13C12-PCB-1077     67     69       13C12-PCB-104     91     81       13C12-PCB-1123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-129     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 13C12-PCB-003        | 56              | 54             |  |
| 13C12-PCB-019     63     59       13C12-PCB-037     58     59       13C12-PCB-054     78     72       13C12-PCB-081     70     69       13C12-PCB-077     67     69       13C12-PCB-104     91     81       13C12-PCB-1123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-169     78     81       13C12-PCB-189     76     77       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13C12-PCB-004        | 63              | 62             |  |
| 13C12-PCB-037     58     59       13C12-PCB-054     78     72       13C12-PCB-081     70     69       13C12-PCB-077     67     69       13C12-PCB-104     91     81       13C12-PCB-123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                 |                |  |
| 13C12-PCB-054     78     72       13C12-PCB-081     70     69       13C12-PCB-077     67     69       13C12-PCB-104     91     81       13C12-PCB-123     67     67       13C12-PCB-118     68     68       13C12-PCB-119     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-166/157     77     76       13C12-PCB-166/157     77     78       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                 |                |  |
| 13C12-PCB-081     70     69       13C12-PCB-077     67     69       13C12-PCB-104     91     81       13C12-PCB-123     67     67       67     67     67       13C12-PCB-118     68     68       13C12-PCB-105     70     71       13C12-PCB-105     70     71       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-165/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                 |                |  |
| 13C12-PCB-077     67     69       13C12-PCB-104     91     81       13C12-PCB-123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                 |                |  |
| 13C12-PCB-104     91     81       13C12-PCB-123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                 |                |  |
| 13C12-PCB-123     67     67       13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                 |                |  |
| 13C12-PCB-118     68     68       13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                 |                |  |
| 13C12-PCB-114     70     70       13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                 |                |  |
| 13C12-PCB-105     70     71       13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                 |                |  |
| 13C12-PCB-126     66     66       13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                 |                |  |
| 13C12-PCB-155     33     41       13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                 |                |  |
| 13C12-PCB-167     77     76       13C12-PCB-156/157     77     78       13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                 |                |  |
| 13C12-PCB-169     78     81       13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                 |                |  |
| 13C12-PCB-188     47     59       13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                 |                |  |
| 13C12-PCB-189     76     77       13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                 |                |  |
| 13C12-PCB-202     52     62       13C12-PCB-205     89     91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                 |                |  |
| 13C12-PCB-205 89 91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                 |                |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                 |                |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                 |                |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 13C12-PCB-208        | 39              | 49             |  |
| 13C12-PCB-206 84 88<br>13C12-PCB-209 20 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                 |                |  |
| Cleanup Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Cleanup Standards    |                 |                |  |
| 13C12-PCB-028 70 69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 13C12-PCB-028        | 70              | 69             |  |
| 13C12-PCB-111 71 71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                 |                |  |
| 13C12-PCB-178 78 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 13C12-PCB-178        | 78              |                |  |

|                               | ALS Life        | Sciences       |  |
|-------------------------------|-----------------|----------------|--|
|                               | Quality Control | Summary Report |  |
| Sample Name                   | Method Blank    | Method Blank   |  |
| ALS Sample ID                 | WG3440853-1     | WG3440853-4    |  |
| Sample Size                   | 1               | 1              |  |
| Sample size units             | Blank           | Blank          |  |
| Percent Moisture              | n/a             | n/a            |  |
| Sample Matrix                 | Swab            | Reagent        |  |
| Sampling Date                 | n/a             | n/a            |  |
| Extraction Date               | 25-Nov-20       | 25-Nov-20      |  |
| Target Analytes               | pg              | pg             |  |
| Homologue Group Totals        |                 |                |  |
| Total MonoCB                  | 10.6            | 5.60           |  |
| Total DiCB                    | 33.0            | 26.2           |  |
| Total TriCB                   | 15.7            | 9.70           |  |
| Total TetraCB                 | 17.9            | 14.9           |  |
| Total PentaCB                 | 3.82            | 4.87           |  |
| Total HexaCB                  | 13.3            | 5.81           |  |
| Total HeptaCB                 | 2.24            | <0.48          |  |
| Total OctaCB                  | 2.10            | <0.67          |  |
| Total NonaCB                  | <3.0            | <2.3           |  |
| DecaCB                        | 270             | 112            |  |
| Total PCB                     | 369             | 179            |  |
| oxic Equivalency - (WHO 2005) |                 |                |  |
| Lower Bound PCB TEQ           | 0.0000471       | 0.00           |  |
| Mid Point PCB TEQ             | 0.257           | 0.0901         |  |
| Upper Bound PCB TEQ           | 0.274           | 0.180          |  |

| Sam                | nlo Anglysis Cymmany Donast |
|--------------------|-----------------------------|
|                    | ple Analysis Summary Report |
| Laboratory Control |                             |
| Sample             |                             |
|                    |                             |
| WG3440853-2        |                             |
| 1                  |                             |
|                    |                             |
|                    |                             |
| n/a                |                             |
| 25-Nov-20          |                             |
| % Rec              |                             |
|                    |                             |
|                    |                             |
| 100                |                             |
| 131                |                             |
|                    |                             |
|                    |                             |
|                    |                             |
|                    |                             |
| 88                 |                             |
| 119                |                             |
| 118                |                             |
| 118                |                             |
|                    |                             |
|                    |                             |
|                    |                             |
| 100                |                             |
| 102                |                             |
| 97                 |                             |
|                    |                             |
|                    |                             |
|                    |                             |
|                    |                             |
| 131                |                             |
| % Rec              |                             |
| 58                 |                             |
|                    |                             |
| 60                 |                             |
| 54                 |                             |
|                    |                             |
|                    |                             |
|                    |                             |
|                    |                             |
| 67                 |                             |
| 63                 |                             |
| 58                 |                             |
| 60                 |                             |
|                    |                             |
|                    |                             |
| 86                 |                             |
| 98                 |                             |
| 92                 |                             |
|                    |                             |
|                    |                             |
|                    |                             |
|                    |                             |
| 77                 |                             |
| 30                 |                             |
|                    |                             |
| 71                 |                             |
| 60                 |                             |
| 71                 |                             |
|                    | WG3440853-2  1              |

## Sample Analysis Report

ALS Sample ID L2526958-1 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Split Ratio E. Sabljic --e-signature--01-Dec-2020 Sample n/a

Run Information Run 1 Filename Run Date 5-201130B25 01-Dec-20 03:06 Final Volume 25 ul Dilution Factor Analysis Units pg

|                     | TEF        | Ret.             | Conc.         | EDL          |            | ЕМРС |          |
|---------------------|------------|------------------|---------------|--------------|------------|------|----------|
| Target Analytes     | (WHO 2005) | Time             | pg            |              | lags       | pg   | LQL      |
|                     | ,          |                  |               |              |            |      |          |
| PCB-001<br>PCB-002  |            | 9.05<br>10.48    | <5.0<br>6.47  | 2.8<br>0.94  | M,J,R      | 5.0  | 50<br>50 |
| PCB-002<br>PCB-003  |            | 10.48            | 6.47<br><7.9  | 0.94         | J<br>M,J,R | 7.9  | 50<br>50 |
| PCB-003             |            | 10.59            | 7.30          | 1.6          | л,,,,<br>ј | 7.5  | 50       |
| PCB-010             |            | NotFnd           | < 0.99        | 0.99         | U          |      | 50       |
| PCB-009             |            | NotFnd           | < 0.99        | 0.99         | U          |      | 50       |
| PCB-007             |            | 12.06            | 7.12          | 0.97         | J          |      | 50       |
| PCB-006             |            | 12.23            | <8.3          | 1.0          | J,R        |      | 50       |
| PCB-005             |            | 12.43            | <1.6          | 1.1          | M,J,R      | 1.6  | 50       |
| PCB-008<br>PCB-014  |            | NotFnd<br>NotFnd | <0.92<br><1.0 | 0.92<br>1.0  | U          |      | 50<br>50 |
| PCB-011             |            | 13.97            | 329           | 1.0          | Ü          |      | 50       |
| PCB-012/013         |            | 14.17            | 22.7          | 1.0          | J          |      | 50       |
| PCB-015             |            | 14.35            | 24.5          | 1.1          | J          |      | 50       |
| PCB-019             |            | 12.69            | <1.3          | 0.61         | J,R        | 1.3  | 50       |
| PCB-018/030         |            | 13.77            | 16.3          | 0.60         | J,B        |      | 50       |
| PCB-017             |            | 14.01            | 8.11          | 0.70         | J          |      | 50       |
| PCB-027             |            | 14.15            | < 0.62        | 0.52         | J,R        | 0.62 | 50       |
| PCB-024<br>PCB-016  |            | NotFnd<br>14.31  | <0.52<br>7.90 | 0.52<br>0.84 | U<br>M 1   |      | 50<br>50 |
| PCB-016<br>PCB-032  |            | 14.31<br>14.58   | 7.90<br>4.43  | 0.84         | ر,M<br>ز   |      | 50       |
| PCB-032<br>PCB-034  |            | NotFnd           | < 0.65        | 0.49         | U          |      | 50       |
| PCB-023             |            | NotFnd           | < 0.61        | 0.61         | U          |      | 50       |
| PCB-026/029         |            | 15.55            | <5.3          | 0.61         | J,R        | 5.3  | 50       |
| PCB-025             |            | 15.68            | <2.5          | 0.55         | J,R        | 2.5  | 50       |
| PCB-031             |            | 15.86            | 28.7          | 0.57         | J,B        |      | 50       |
| PCB-020/028         |            | 16.03            | 34.2          | 0.61         | J          |      | 50       |
| PCB-021/033         |            | 16.16            | 20.9          | 0.60<br>0.64 | )<br>J     |      | 50<br>50 |
| PCB-022<br>PCB-036  |            | 16.41<br>NotFnd  | 12.8<br><0.61 | 0.64         | U          |      | 50<br>50 |
| PCB-039             |            | NotFnd           | < 0.62        | 0.62         | U          |      | 50       |
| PCB-038             |            | NotFnd           | < 0.67        | 0.67         | Ü          |      | 50       |
| PCB-035             |            | 18.04            | 11.1          | 0.70         | j          |      | 50       |
| PCB-037             |            | 18.27            | 22.9          | 0.86         | J          |      | 50       |
| PCB-054             |            | NotFnd           | <0.26         | 0.26         | U          |      | 50       |
| PCB-050/053         |            | 15.69            | 2.81          | 0.38         | J          |      | 50       |
| PCB-045/051         |            | 16.11            | 5.23          | 0.40         | J,B        | 0.03 | 50       |
| PCB-046<br>PCB-052  |            | 16.28<br>17.01   | <0.92<br>36.5 | 0.46<br>0.41 | J,R<br>J   | 0.92 | 50<br>50 |
| PCB-052<br>PCB-073  |            | NotFnd           | < 0.30        | 0.41         | U          |      | 50       |
| PCB-073             |            | 17.15            | <1.0          | 0.52         | J,R        | 1.0  | 50       |
| PCB-049/069         |            | 17.28            | 14.6          | 0.37         | 3,10       |      | 50       |
| PCB-048             |            | 17.44            | <4.9          | 0.41         | J,R        | 4.9  | 50       |
| PCB-044/047/065     |            | 17.57            | 40.8          | 0.38         | J,B        |      | 50       |
| PCB-059/062/075     |            | 17.75            | <2.2          | 0.31         | J,R        |      | 50       |
| PCB-042             |            | 17.87            | <6.4          | 0.47         | J,R        | 6.4  | 50       |
| PCB-040/041/071     |            | 18.13            | 16.5          | 0.44         | J          |      | 50       |
| PCB-064<br>PCB-072  |            | 18.25<br>NotFnd  | 13.2<br><0.57 | 0.32<br>0.57 | J<br>U     |      | 50<br>50 |
| PCB-068             |            | 18.81            | 4.12          | 0.57         | J          |      | 50       |
| PCB-057             |            | NotFnd           | < 0.61        | 0.61         | U          |      | 50       |
| PCB-058             |            | NotFnd           | <0.55         | 0.55         | Ū          |      | 50       |
| PCB-067             |            | NotFnd           | < 0.51        | 0.51         | U          |      | 50       |
| PCB-063             |            | NotFnd           | < 0.56        | 0.56         | U          |      | 50       |
| PCB-061/070/074/076 |            | 19.60            | 82.0          | 0.58         | М          |      | 50       |
| PCB-066             |            | 19.78            | 38.4          | 0.57         | М,З        |      | 50       |
| PCB-055<br>PCB-056  |            | NotFnd<br>20.16  | <0.62<br>26.2 | 0.62<br>0.63 | U          |      | 50<br>50 |
| PCB-060             |            | 20.16            | 12.6          | 0.63         |            |      | 50<br>50 |
| PCB-080             |            | NotFnd           | < 0.53        | 0.53         | U          |      | 50       |
| PCB-079             |            | 21.24            | < 0.73        | 0.57         |            | 0.73 | 50       |
| PCB-078             |            | NotFnd           | < 0.67        | 0.67         | U          | -    | 50       |
| PCB-081             | 0.0003     | NotFnd           | < 0.70        | 0.70         | U          |      | 50       |
| PCB-077             | 0.0001     | 22.13            | 11.3          | 0.76         | J          |      | 50       |
| PCB-104             |            | NotFnd           | <0.38         | 0.38         | U          |      | 50       |
| PCB-096             |            | NotFnd           | < 0.36        | 0.36         | U          |      | 50       |
| PCB-103             |            | NotFnd           | < 0.72        | 0.72         | U          |      | 50       |
| PCB-094<br>PCB-095  |            | NotFnd<br>19.13  | <0.84<br>45.3 | 0.84<br>0.76 | U          |      | 50<br>50 |
| PCB-093/098/100/102 |            | 19.13            | <2.2          | 0.79         | M,J,R      | 2.2  | 50       |

## Sample Analysis Report

ALS Sample ID L2526958-1 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Sample Size Percent Moisture Split Ratio Sample n/a

E. Sabljic --e-signature--01-Dec-2020

Approved:

Run Information Run 1 Filename Run Date 5-201130B25 01-Dec-20 03:06 Final Volume 25 ul Dilution Factor Analysis Units pg

|                                                        | TEF               | Dat.            | Co            | EDL          |              | EMPC       |           |
|--------------------------------------------------------|-------------------|-----------------|---------------|--------------|--------------|------------|-----------|
| Target Analytes                                        | TEF<br>(WHO 2005) | Ret.<br>Time    | Conc.<br>pg   |              | lags         | EMPC<br>pg | LQL       |
|                                                        | /                 |                 |               |              |              |            |           |
| PCB-088/091<br>PCB-084                                 |                   | 19.59<br>19.74  | 8.67<br>20.7  | 0.81<br>0.92 | j            |            | 50<br>50  |
| PCB-089                                                |                   | 19.74           | <1.2          | 0.92         | J,R          |            | 50        |
| PCB-121                                                |                   | NotFnd          | < 0.61        | 0.61         | U            |            | 50        |
| PCB-092                                                |                   | 20.34           | 13.8          | 0.90         | J            |            | 50        |
| PCB-090/101/113                                        |                   | 20.64           | 80.4          | 0.73         |              |            | 50        |
| PCB-083/099                                            |                   | 20.96           | 46.5          | 0.89         | j            |            | 50        |
| PCB-112<br>PCB-086/087/097/109/119/125                 |                   | NotFnd<br>21.31 | <0.64<br>77.1 | 0.64<br>0.76 | U<br>M       |            | 50<br>50  |
| PCB-086/087/097/109/119/125<br>PCB-085/110/115/116/117 |                   | 21.31           | 160           | 0.76         | M            |            | 50<br>50  |
| PCB-082                                                |                   | 21.92           | <15           | 1.2          | J,R          |            | 50        |
| PCB-111                                                |                   | NotFnd          | < 0.66        | 0.66         | U            |            | 50        |
| PCB-120                                                |                   | NotFnd          | < 0.65        | 0.65         | U            |            | 50        |
| PCB-108/124                                            |                   | 22.90           | 5.09          | 1.2          | J            |            | 50        |
| PCB-107                                                | 0.00000           | 23.03           | <6.6          | 1.0          | M,J,R        |            | 50        |
| PCB-123                                                | 0.00003           | 23.09           | <1.7          | 1.3          | M,J,R        |            | 50        |
| PCB-106<br>PCB-118                                     | 0.00003           | NotFnd<br>23.26 | <1.2<br>118   | 1.2<br>1.2   | U            |            | 50<br>50  |
| PCB-118                                                | 0.00005           | 23.47           | 2.44          | 1.3          | J            |            | 50        |
| PCB-114                                                | 0.00003           | 23.56           | 3.39          | 1.2          | j            |            | 50        |
| PCB-105                                                | 0.00003           | 23.91           | 54.3          | 1.3          |              |            | 50        |
| PCB-127                                                |                   | 24.64           | <1.3          | 1.3          |              | 0.36       | 50        |
| PCB-126                                                | 0.1               | 25.51           | <1.7          | 1.7          |              | 1.4        | 50        |
| PCB-155                                                |                   | 20.50           | < 0.45        | 0.32         |              | 0.45       | 50        |
| PCB-152                                                |                   | NotFnd          | < 0.41        | 0.41         | U            |            | 50        |
| PCB-150<br>PCB-136                                     |                   | NotFnd<br>20.97 | <0.40<br>8.67 | 0.40<br>0.43 | U            |            | 50<br>50  |
| PCB-136<br>PCB-145                                     |                   | NotFnd          | < 0.43        | 0.43         | U            |            | 50        |
| PCB-148                                                |                   | NotFnd          | < 0.61        | 0.61         | U            |            | 50        |
| PCB-135/151                                            |                   | 22.20           | 25.9          | 0.64         | м,3          |            | 50        |
| PCB-154                                                |                   | 22.28           | < 0.50        | 0.50         | M,U          |            | 50        |
| PCB-144                                                |                   | 22.46           | 4.66          | 0.66         | J            |            | 50        |
| PCB-147/149                                            |                   | 22.66           | 74.5          | 1.1          |              |            | 50        |
| PCB-134/143                                            |                   | 22.79           | < 5.7         | 1.3          |              | 5.7        | 50        |
| PCB-139/140                                            |                   | 22.96           | <2.4          | 1.1          | J,R          |            | 50<br>50  |
| PCB-131<br>PCB-142                                     |                   | 23.10<br>NotFnd | <1.6<br><1.3  | 1.4<br>1.3   | J,R<br>U     |            | 50<br>50  |
| PCB-142<br>PCB-132                                     |                   | 23.35           | 43.6          | 1.3          | J            |            | 50        |
| PCB-133                                                |                   | 23.54           | <1.4          | 1.3          | J,R          |            | 50        |
| PCB-165                                                |                   | NotFnd          | < 0.98        | 0.98         | U            |            | 50        |
| PCB-146                                                |                   | 23.87           | 14.2          | 1.1          | J            |            | 50        |
| PCB-161                                                |                   | NotFnd          | < 0.94        | 0.94         | U            |            | 50        |
| PCB-153/168                                            |                   | 24.18           | 85.3          | 0.98         | _            |            | 50        |
| PCB-141<br>PCB-130                                     |                   | 24.31<br>24.54  | 26.8<br><7.3  | 1.3<br>1.5   | J<br>1 D     |            | 50<br>50  |
| PCB-137/164                                            |                   | 24.54           | <7.3<br><14   | 1.5          | J,K<br>M,J,R | 7.3        | 50        |
| PCB-129/138/163                                        |                   | 24.71           | 148           | 1.3          | 1-1,5/1      |            | 50        |
| PCB-160                                                |                   | NotFnd          | <1.0          | 1.0          | U            |            | 50        |
| PCB-158                                                |                   | 25.07           | 15.2          | 0.84         | j            |            | 50        |
| PCB-128/166                                            |                   | 25.57           | <20           | 1.2          | J,R          |            | 50        |
| PCB-159                                                |                   | 25.99           | < 0.99        | 0.99         | U            |            | 50        |
| PCB-162                                                | 0.00000           | 26.14           | <1.0          | 1.0          | U            |            | 50        |
| PCB-167                                                | 0.00003           | 26.39           | <5.3          | 0.94         | J,R          |            | 50        |
| PCB-156/157<br>PCB-169                                 | 0.00003           | 27.02<br>28.67  | <15<br><1.1   | 1.3<br>1.1   | J,R<br>U     |            | 100<br>50 |
| PCB-189                                                | 0.03              | NotFnd          | <0.49         | 0.49         | U            |            | 50        |
| PCB-179                                                |                   | 23.71           | 6.30          | 0.57         | j            |            | 50        |
| PCB-184                                                |                   | 23.94           | <0.55         | 0.51         |              | 0.55       | 50        |
| PCB-176                                                |                   | 24.16           | <1.4          | 0.58         | J,R          | 1.4        | 50        |
| PCB-186                                                |                   | NotFnd          | < 0.60        | 0.60         | U            |            | 50        |
| PCB-178                                                |                   | 25.06           | <4.1          | 0.88         |              | 4.1        | 50        |
| PCB-175                                                |                   | 25.42           | < 0.87        | 0.87         |              | 0.70       | 50        |
| PCB-187                                                |                   | 25.53           | 20.3          | 0.74         | J,B          |            | 50        |
| PCB-182<br>PCB-183                                     |                   | NotFnd<br>25.85 | <0.81<br>12.0 | 0.81<br>0.82 | U            |            | 50<br>50  |
| PCB-183<br>PCB-185                                     |                   | 25.85<br>25.92  | <1.7          | 0.82         |              | 1.7        | 50        |
| PCB-174                                                |                   | 26.00           | 20.8          | 0.89         | M,J          |            | 50        |
| PCB-177                                                |                   | 26.23           | 10.2          | 0.94         | ,,,,<br>J    |            | 50        |
| PCB-181                                                |                   | 26.42           | <0.88         | 0.88         | U            |            | 50        |
| PCB-171/173                                            |                   | 26.57           | 6.74          | 0.96         | J            |            | 50        |
| PCB-172                                                |                   | 27.33           | 3.89          | 0.96         | J            |            | 50        |

## Sample Analysis Report

 Sample Name
 BA-1

 ALS Sample ID
 L2526958-1

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information Run 1

 $\begin{array}{ccc} \text{Filename} & 5\text{-}20113 \text{-}3\text{-}25 \\ \text{Run Date} & 01\text{-}\text{Dec}\text{-}2\text{-}3\text{-}166 \\ \text{Final Volume} & 25 & \text{ul} \\ \text{Dilution Factor} & 1 \\ \text{Analysis Units} & \text{pg} \end{array}$ 

 Analysis Units
 pg

 Instrument - Column
 HRMS-5
 SPBOCTYL256001-01

|                      | TEF        | Ret.           | Conc.  | EDL              |      | EMPC |     |
|----------------------|------------|----------------|--------|------------------|------|------|-----|
| Target Analytes      | (WHO 2005) | Time           | pg     | pg F             | lags | pg   | LQL |
|                      |            |                |        |                  |      |      |     |
| PCB-192              |            | NotFnd         | < 0.74 | 0.74             | U    |      | 50  |
| PCB-180/193          |            | 27.68          | 44.6   | 0.73             | J    |      | 50  |
| PCB-191              |            | 27.87          | <1.4   | 0.63             |      | 1.4  | 50  |
| PCB-170              |            | 28.37          | 17.4   | 0.73             | 1    |      | 50  |
| PCB-190              |            | 28.65          | <3.4   | 0.46             |      | 3.4  | 50  |
| PCB-189              | 0.00003    | 29.96          | 1.46   | 0.72             | J    |      | 50  |
| PCB-202              |            | 26.27          | <2.4   | 0.51             | J,R  | 2.4  | 50  |
| PCB-201              |            | 26.74          | 2.03   | 0.49             | J    |      | 50  |
| PCB-204              |            | NotFnd         | < 0.49 | 0.49             | U    |      | 50  |
| PCB-197              |            | 27.20          | < 0.54 | 0.48             | J,R  | 0.54 | 50  |
| PCB-200              |            | NotFnd         | < 0.50 | 0.50             | U    |      | 50  |
| PCB-198/199          |            | 28.69          | 6.94   | 0.48             | 1    |      | 50  |
| PCB-196              |            | 29.01          | <3.5   | 0.47             |      | 3.5  | 50  |
| PCB-203              |            | 29.12          | 5.42   | 0.46             | ]    |      | 50  |
| PCB-195              |            | 29.85          | <3.0   | 0.71             |      | 3.0  | 50  |
| PCB-193              |            | 31.06          | 10.4   | 0.75             | ٦,,٠ |      | 50  |
|                      |            |                |        |                  |      |      |     |
| PCB-205              |            | 31.35          | < 0.92 | 0.65             |      | 0.92 | 50  |
| PCB-208              |            | 29.68          | <2.5   | 1.1              |      | 2.5  | 50  |
| PCB-207              |            | 30.15          | <1.8   | 1.2              | J,R  |      | 50  |
| PCB-206              |            | 32.40          | 9.73   | 1.8              | J    |      | 50  |
| PCB-209              |            | 33.53          | 38.8   | 1.6              | J,E  |      | 50  |
|                      |            |                |        |                  |      |      |     |
| Extraction Standards | pg         | Time           | % Rec  | Limits           |      |      |     |
| 13C12-PCB-001        | 2000       | 9.01           | 54     | 5-145            |      |      |     |
| 13C12-PCB-001        | 2000       | 10.58          | 61     | 5-145            |      |      |     |
|                      |            | 10.38          |        | 5-145            |      |      |     |
| 13C12-PCB-004        | 2000       |                | 67     |                  |      |      |     |
| 13C12-PCB-015        | 2000       | 14.34          | 59     | 5-145            |      |      |     |
| 13C12-PCB-019        | 2000       | 12.67          | 69     | 5-145            |      |      |     |
| 13C12-PCB-037        | 2000       | 18.26          | 65     | 5-145            |      |      |     |
| 13C12-PCB-054        | 2000       | 14.50          |        | 5-145            |      |      |     |
| 13C12-PCB-081        | 2000       | 21.81          | 71     | 10-145           |      |      |     |
| 13C12-PCB-077        | 2000       | 22.11          | 69     | 10-145           |      |      |     |
| 13C12-PCB-104        | 2000       | 17.51          | 88     | 10-145           |      |      |     |
| 13C12-PCB-123        | 2000       | 23.08          | 67     | 10-145           |      |      |     |
| 13C12-PCB-118        | 2000       | 23.25          | 65     | 10-145           |      |      |     |
| 13C12-PCB-114        | 2000       | 23.55          |        | 10-145           |      |      |     |
| 13C12-PCB-105        | 2000       | 23.90          |        | 10-145           |      |      |     |
| 13C12-PCB-126        | 2000       | 25.51          |        | 10-145           |      |      |     |
| 13C12-PCB-155        | 2000       | 20.48          |        | 10-145           |      |      |     |
| 13C12-PCB-167        | 2000       | 26.38          |        | 10-145           |      |      |     |
| 13C12-PCB-156/157    | 4000       | 27.02          |        | 10-145           |      |      |     |
|                      |            |                |        |                  |      |      |     |
| 13C12-PCB-169        | 2000       | 28.67          |        | 10-145           |      |      |     |
| 13C12-PCB-188        | 2000       | 23.48          |        | 10-145           |      |      |     |
| 13C12-PCB-189        | 2000       | 29.95          |        | 10-145           |      |      |     |
| 13C12-PCB-202        | 2000       | 26.25          |        | 10-145           |      |      |     |
| 13C12-PCB-205        | 2000       | 31.33          |        | 10-145           |      |      |     |
| 13C12-PCB-208        | 2000       | 29.67          |        | 10-145           |      |      |     |
| 13C12-PCB-206        | 2000       | 32.39          | 92     | 10-145           |      |      |     |
| 13C12-PCB-209        | 2000       | 33.50          | 88     | 10-145           |      |      |     |
| Cleanup Standards    |            |                |        |                  |      |      |     |
| 12012 000 020        | 3000       | 16.01          | 70     | F 14F            |      |      |     |
| 13C12-PCB-028        | 2000       | 16.01          |        | 5-145            |      |      |     |
| 13C12-PCB-111        | 2000       | 22.01<br>25.05 |        | 10-145<br>10-145 |      |      |     |
| 13C12-PCB-178        | 2000       |                |        |                  |      |      |     |

#### **ALS Life Sciences Sample Analysis Report** Sampling Date ALS Sample ID L2526958-1 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B25 Run Date 01-Dec-20 03:06 Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 19.4 0.51 200 Total DiCB 400 401 0.92 Total TriCB 177 400 Total TetraCB Total PentaCB 320 662 0.26 0.36 800 800 Total HexaCB 156 35.2 Total HeptaCB 0.46 400 Total OctaCB 0.46 400 Total NonaCB 14.0 200 1.1 DecaCB 38.8 1.6 200 Total PCB 2340 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00644 Mid Point PCB TEO 0.109 Upper Bound PCB TEQ 0.210 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that the analyte was positively identifed. The associated numerical result is an estimate. Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

В

EMPC

## Sample Analysis Report

 Sample Name
 BA-2

 ALS Sample ID
 L2526958-2

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011.3∪B26

 Run Date
 01-Dec-2∪ 3:48

 Final Volume
 25
 u

 Dilution Factor
 1
 u

 Analysis Units
 pg
 u

 Analysis Units
 pg

 Instrument - Column
 HRMS-5
 SPBOCTYL256001-01

|                                    | TEF        | Ret.            | Conc.        | EDL          |            | ЕМРС |          |
|------------------------------------|------------|-----------------|--------------|--------------|------------|------|----------|
| Target Analytes                    | (WHO 2005) | Time            | pg           | pg I         | Flags      | pg   | LQL      |
| PCB-001                            |            | 8.95            | <3.2         | 0.65         | MID        | 3 2  | 50       |
| PCB-001<br>PCB-002                 |            | 10.37           | <3.2<br>7.71 | 0.65<br>0.71 | M,J,R<br>J | 3.2  | 50       |
| PCB-003                            |            | 10.49           | 8.07         | 0.71         | j          |      | 50       |
| PCB-004                            |            | 10.65           | 7.11         | 2.6          | M,J        |      | 50       |
| PCB-010                            |            | NotFnd          | <1.6         | 1.6          | U          |      | 50       |
| PCB-009                            |            | NotFnd          | <1.6         | 1.6          | U          |      | 50       |
| PCB-007                            |            | 12.01           | 17.3         | 1.6          | J          |      | 50       |
| PCB-006                            |            | 12.16           | 10.1         | 1.7          | J          |      | 50       |
| PCB-005                            |            | NotFnd          | <1.9         | 1.9          | U<br>M 1 P |      | 50       |
| PCB-008<br>PCB-014                 |            | 12.44<br>NotFnd | 18.9<br><1.5 | 1.5<br>1.5   | M,J,B<br>U |      | 50<br>50 |
| PCB-014<br>PCB-011                 |            | 13.95           | <1.5<br>445  | 1.5          | U          |      | 50       |
| PCB-012/013                        |            | 14.14           | 20.1         | 1.5          | j          |      | 50       |
| PCB-015                            |            | 14.32           | <9.4         | 1.7          | J,R        | 9.4  | 50       |
| PCB-019                            |            | 12.64           | 2.93         | 1.2          | j          |      | 50       |
| PCB-018/030                        |            | 13.73           | 17.4         | 1.3          | J,B        |      | 50       |
| PCB-017                            |            | 13.98           | 7.31         | 1.5          | J          |      | 50       |
| PCB-027                            |            | 14.11           | <1.1         | 1.1          |            | 0.92 | 50       |
| PCB-024                            |            | 14.21           | <1.1         | 1.1          | U          |      | 50       |
| PCB-016                            |            | 14.28           | <8.0         | 1.8          | J,R        |      | 50       |
| PCB-032<br>PCB-034                 |            | 14.55<br>NotFnd | <4.4         | 1.0          | J,R<br>U   | 4.4  | 50<br>50 |
| PCB-034<br>PCB-023                 |            | NotFnd          | <1.1<br><1.0 | 1.1          | U          |      | 50       |
| PCB-026/029                        |            | 15.53           | 4.79         | 1.0          | j          |      | 50       |
| PCB-025                            |            | 15.67           | 1.94         | 0.93         | j          |      | 50       |
| PCB-031                            |            | 15.85           | <19          | 0.96         | M,J,R      | 19   | 50       |
| PCB-020/028                        |            | 16.02           | 23.3         | 1.0          | М,Ј        |      | 50       |
| PCB-021/033                        |            | 16.16           | <14          | 1.0          | M,J,R      | 14   | 50       |
| PCB-022                            |            | 16.40           | 9.68         | 1.1          | J          |      | 50       |
| PCB-036                            |            | NotFnd          | <1.0         | 1.0          | U          |      | 50       |
| PCB-039                            |            | NotFnd          | <1.0         | 1.0          | U          |      | 50       |
| PCB-038<br>PCB-035                 |            | NotFnd<br>18.02 | <1.1<br>9.12 | 1.1<br>1.2   | U          |      | 50<br>50 |
| PCB-035<br>PCB-037                 |            | 18.02           | <7.8         | 1.5          | J,R        | 7.8  | 50       |
| PCB-057                            |            | NotFnd          | <0.35        | 0.35         | J,K<br>U   | 7.0  | 50       |
| PCB-050/053                        |            | 15.69           | 3.52         | 0.93         | j          |      | 50       |
| PCB-045/051                        |            | 16.10           | 15.7         | 0.98         | j          |      | 50       |
| PCB-046                            |            | 16.27           | <1.1         | 1.1          | U          | 1.0  | 50       |
| PCB-052                            |            | 17.00           | 32.3         | 1.0          | J          |      | 50       |
| PCB-073                            |            | NotFnd          | < 0.74       | 0.74         | U          |      | 50       |
| PCB-043                            |            | NotFnd          | <1.3         | 1.3          | U          |      | 50       |
| PCB-049/069                        |            | 17.26           | 11.8         | 0.90         | J          |      | 50       |
| PCB-048                            |            | 17.43           | 4.58         | 1.0          | J          |      | 50       |
| PCB-044/047/065<br>PCB-059/062/075 |            | 17.57<br>17.74  | 58.7<br><1.8 | 0.94<br>0.77 | 1 P        | 1.8  | 50<br>50 |
| PCB-059/062/075<br>PCB-042         |            | 17.74           | 5.84         | 1.2          | J,K        | 1.0  | 50       |
| PCB-040/041/071                    |            | 18.12           | 11.8         | 1.1          | M,J,B      |      | 50       |
| PCB-064                            |            | 18.25           | 9.10         | 0.78         | ,.,.       |      | 50       |
| PCB-072                            |            | NotFnd          | < 0.94       | 0.94         | U          |      | 50       |
| PCB-068                            |            | 18.81           | 10.6         | 0.88         | J          |      | 50       |
| PCB-057                            |            | NotFnd          | <1.0         | 1.0          | U          |      | 50       |
| PCB-058                            |            | NotFnd          | < 0.91       | 0.91         | U          |      | 50       |
| PCB-067                            |            | NotFnd          | < 0.84       | 0.84         | U          |      | 50       |
| PCB-063                            |            | NotFnd          | < 0.93       | 0.93         | U          |      | 50       |
| PCB-061/070/074/076                |            | 19.60           | 33.4         | 0.95         | J<br>1     |      | 50<br>50 |
| PCB-066<br>PCB-055                 |            | 19.78<br>NotFnd | 12.7<br><1.0 | 0.94<br>1.0  | J<br>U     |      | 50<br>50 |
| PCB-055                            |            | 20.16           | 12.3         | 1.0          | J,B        |      | 50       |
| PCB-050                            |            | 20.10           | 3.75         | 1.0          | J,C        |      | 50       |
| PCB-080                            |            | NotFnd          | <0.88        | 0.88         | Ú          |      | 50       |
| PCB-079                            |            | NotFnd          | < 0.93       | 0.93         | U          |      | 50       |
| PCB-078                            |            | NotFnd          | <1.1         | 1.1          | U          |      | 50       |
| PCB-081                            | 0.0003     | NotFnd          | <1.3         | 1.3          | U          |      | 50       |
| PCB-077                            | 0.0001     | 22.16           | 6.85         | 1.4          | M,J        |      | 50       |
| PCB-104                            |            | NotFnd          | <0.85        | 0.85         | U          |      | 50       |
| PCB-096                            |            | NotFnd          | < 0.95       | 0.95         | U          |      | 50       |
| PCB-103<br>PCB-094                 |            | NotFnd          | <1.6         | 1.6          | U          |      | 50<br>50 |
| PCB-094<br>PCB-095                 |            | NotFnd<br>19.13 | <1.9<br>25.8 | 1.9<br>1.7   | U          |      | 50<br>50 |
| PCB-093/098/100/102                |            | NotFnd          | <1.8         | 1.8          | Ü          |      | 50       |
| ,, 100, 102                        |            |                 | .1.0         | 1.0          |            |      |          |

## Sample Analysis Report

ALS Sample ID L2526958-2 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Split Ratio E. Sabljic --e-signature--01-Dec-2020 Sample n/a

Run Information Run 1 Filename Run Date 5-201130B26 01-Dec-20 03:48 Final Volume 25 ul Dilution Factor Analysis Units pg

|                                                        | TEF               | Ret.            | Conc.         | EDL          |          | ЕМРС       |          |
|--------------------------------------------------------|-------------------|-----------------|---------------|--------------|----------|------------|----------|
| Target Analytes                                        | TEF<br>(WHO 2005) | Ret.<br>Time    | Conc.<br>pg   | EDL<br>pg Fl | ags      | EMPC<br>pg | LQL      |
|                                                        | (                 |                 |               |              |          |            |          |
| PCB-088/091                                            |                   | 19.60           | 4.45          | 1.8          | J        |            | 50       |
| PCB-084<br>PCB-089                                     |                   | 19.74<br>NotFnd | 9.96<br><2.1  | 2.1<br>2.1   | J<br>U   |            | 50<br>50 |
| PCB-089<br>PCB-121                                     |                   | NotFnd          | <2.1<br><1.4  | 1.4          | U        |            | 50       |
| PCB-092                                                |                   | 20.35           | 8.60          | 2.0          | j        |            | 50       |
| PCB-090/101/113                                        |                   | 20.65           | 38.2          | 1.6          | J,B      |            | 50       |
| PCB-083/099                                            |                   | 20.96           | <16           | 2.0          | J,R      |            | 50       |
| PCB-112                                                |                   | NotFnd          | <1.4          | 1.4          | U        |            | 50       |
| PCB-086/087/097/109/119/125<br>PCB-085/110/115/116/117 |                   | 21.31<br>21.73  | 29.6<br>61.2  | 1.7<br>1.6   | M,J<br>M |            | 50<br>50 |
| PCB-083/110/113/110/117                                |                   | 21.92           | <6.5          | 2.6          | J,R      |            | 50       |
| PCB-111                                                |                   | NotFnd          | <1.5          | 1.5          | U        |            | 50       |
| PCB-120                                                |                   | NotFnd          | <1.5          | 1.5          | U        |            | 50       |
| PCB-108/124                                            |                   | NotFnd          | <2.0          | 2.0          | U        |            | 50       |
| PCB-107                                                |                   | NotFnd          | <1.8          | 1.8          | U        |            | 50       |
| PCB-123                                                | 0.00003           | NotFnd          | <2.4          | 2.4          | U        |            | 50       |
| PCB-106                                                | 0.00003           | NotFnd          | <2.1          | 2.1          | U        |            | 50       |
| PCB-118<br>PCB-122                                     | 0.00003           | 23.26<br>NotFnd | 46.9<br><2.3  | 2.3<br>2.3   | J<br>U   |            | 50<br>50 |
| PCB-114                                                | 0.00003           | NotFnd          | <2.2          | 2.2          | U        |            | 50       |
| PCB-105                                                | 0.00003           | 23.93           | <17           | 2.5          | J,R      |            | 50       |
| PCB-127                                                |                   | NotFnd          | <2.2          | 2.2          | Ū        |            | 50       |
| PCB-126                                                | 0.1               | NotFnd          | <3.1          | 3.1          | U        |            | 50       |
| PCB-155                                                |                   | NotFnd          | <1.1          | 1.1          | U        |            | 50       |
| PCB-152                                                |                   | NotFnd          | < 0.87        | 0.87         | U        |            | 50       |
| PCB-150                                                |                   | NotFnd          | < 0.84        | 0.84         | U        |            | 50       |
| PCB-136<br>PCB-145                                     |                   | 20.97<br>NotFnd | 7.54<br><0.91 | 0.91<br>0.91 | J<br>U   |            | 50<br>50 |
| PCB-143                                                |                   | NotFnd          | <1.3          | 1.3          | U        |            | 50       |
| PCB-135/151                                            |                   | 22.18           | 16.6          | 1.4          | М,Ј      |            | 50       |
| PCB-154                                                |                   | 22.28           | <1.1          | 1.1          | U        |            | 50       |
| PCB-144                                                |                   | 22.46           | 2.72          | 1.4          | j        |            | 50       |
| PCB-147/149                                            |                   | 22.66           | 45.3          | 1.6          | J,B      |            | 50       |
| PCB-134/143                                            |                   | NotFnd          | <2.0          | 2.0          | U        |            | 50       |
| PCB-139/140                                            |                   | NotFnd          | <1.6          | 1.6          | U        |            | 50       |
| PCB-131                                                |                   | NotFnd          | <2.0          | 2.0          | U        |            | 50       |
| PCB-142                                                |                   | NotFnd          | < 2.0         | 2.0          | U        |            | 50<br>E0 |
| PCB-132<br>PCB-133                                     |                   | 23.37<br>NotFnd | 25.3<br><1.9  | 1.9<br>1.9   | J<br>U   |            | 50<br>50 |
| PCB-155                                                |                   | NotFnd          | <1.4          | 1.4          | U        |            | 50       |
| PCB-146                                                |                   | 23.88           | <7.7          | 1.6          | J,R      |            | 50       |
| PCB-161                                                |                   | NotFnd          | <1.4          | 1.4          | U        |            | 50       |
| PCB-153/168                                            |                   | 24.19           | 50.3          | 1.4          |          |            | 50       |
| PCB-141                                                |                   | 24.32           | 12.4          | 1.9          | J        |            | 50       |
| PCB-130                                                |                   | 24.54           | <4.3          | 2.3          |          | 4.3        | 50       |
| PCB-137/164                                            |                   | 24.72           | 10.3          | 1.6          | M,J      |            | 50       |
| PCB-129/138/163<br>PCB-160                             |                   | 24.88<br>NotFnd | 75.7<br><1.5  | 1.9<br>1.5   | U        |            | 50<br>50 |
| PCB-158                                                |                   | 25.07           | 9.90          | 1.5          | J        |            | 50       |
| PCB-138/166                                            |                   | 25.58           | 11.9          | 1.7          | j        |            | 50       |
| PCB-159                                                |                   | 26.02           | <1.4          | 1.4          | U        |            | 50       |
| PCB-162                                                |                   | NotFnd          | <1.5          | 1.5          | U        |            | 50       |
| PCB-167                                                | 0.00003           | 26.39           | 3.00          | 1.2          | J        |            | 50       |
| PCB-156/157                                            | 0.00003           | 27.02           | <3.5          | 1.7          | J,R      |            | 100      |
| PCB-169                                                | 0.03              | NotFnd          | <1.4          | 1.4          | U        |            | 50       |
| PCB-188                                                |                   | NotFnd          | <1.1          | 1.1          | U        |            | 50       |
| PCB-179                                                |                   | 23.72           | 5.49          | 0.96         | J        |            | 50<br>50 |
| PCB-184<br>PCB-176                                     |                   | NotFnd<br>24.17 | <0.86<br>2.12 | 0.86<br>0.97 | U        |            | 50       |
| PCB-176<br>PCB-186                                     |                   | NotFnd          | <1.0          | 1.0          | U        |            | 50       |
| PCB-178                                                |                   | 25.06           | <4.7          | 1.5          |          | 4.7        | 50       |
| PCB-175                                                |                   | NotFnd          | <1.5          | 1.5          | U        |            | 50       |
| PCB-187                                                |                   | 25.53           | 18.8          | 1.2          | J,B      |            | 50       |
| PCB-182                                                |                   | NotFnd          | <1.4          | 1.4          | Ū        |            | 50       |
| PCB-183                                                |                   | 25.86           | 12.8          | 1.4          | M,J      |            | 50       |
| PCB-185                                                |                   | NotFnd          | <1.4          | 1.4          | U        |            | 50       |
| PCB-174                                                |                   | 26.02           | 19.2          | 1.5          | M,J      |            | 50       |
| PCB-177                                                |                   | 26.25           | <6.3          | 1.6          |          | 6.3        | 50       |
| PCB-181                                                |                   | NotFnd          | <1.5          | 1.5          | U        |            | 50       |
| PCB-171/173<br>PCB-172                                 |                   | 26.57<br>27.36  | 6.42<br><3.1  | 1.6<br>1.6   | J<br>1 R | 3.1        | 50<br>50 |

## Sample Analysis Report

 Sample Name
 BA-2

 ALS Sample ID
 L2526958-2

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information Run 1

 $\begin{array}{cccc} Filename & 5-201130B26 \\ Run Date & 01-0e^{-2}0 03:48 \\ Final Volume & 25 & ul \\ Dilution Factor & 1 \\ Analysis Units & pg \\ \end{array}$ 

|                                    | TEF          | Ret.           | Conc.  | EDL              |     | EMPC |     |
|------------------------------------|--------------|----------------|--------|------------------|-----|------|-----|
| Target Analytes                    | (WHO 2005)   | Time           | pg     | pg Fl            | ags | pg   | LQL |
| PCB-192                            |              | NotFnd         | <1.2   | 1.2              | U   |      | 50  |
| PCB-180/193                        |              | 27.68          | 51.0   | 1.2              | ·   |      | 50  |
| PCB-191                            |              | NotFnd         | <1.0   | 1.0              | U   |      | 50  |
| PCB-170                            |              | 28.38          | <14    | 1.2              | J,R | 14   | 50  |
| PCB-170                            |              | 28.64          | <2.8   | 0.76             | J,R |      | 50  |
| PCB-190                            | 0.00003      | NotFnd         | <0.88  | 0.88             | U   | 2.0  | 50  |
| PCB-189                            | 0.00003      |                |        | 1.3              | j   |      | 50  |
|                                    |              | 26.25          | 2.17   |                  |     |      |     |
| PCB-201                            |              | NotFnd         | < 0.98 | 0.98             | U   |      | 50  |
| PCB-204                            |              | NotFnd         | < 0.97 | 0.97             | U   |      | 50  |
| PCB-197                            |              | NotFnd         | < 0.95 | 0.95             | U   |      | 50  |
| PCB-200                            |              | NotFnd         | <0.99  | 0.99             | U   |      | 50  |
| PCB-198/199                        |              | 28.70          | 7.94   | 0.95             | J   |      | 50  |
| PCB-196                            |              | 29.04          | 3.34   | 0.93             | J   |      | 50  |
| PCB-203                            |              | 29.13          | <3.2   | 0.92             |     | 3.2  | 50  |
| PCB-195                            |              | 29.85          | <2.6   | 1.2              | J,R |      | 50  |
| PCB-194                            |              | 31.06          | <6.5   | 1.2              | J,R | 6.5  | 50  |
| PCB-205                            |              | NotFnd         | <0.86  | 0.86             | U   |      | 50  |
| PCB-208                            |              | 29.71          | < 5.1  | 3.3              |     | 5.1  | 50  |
| PCB-207                            |              | 30.17          | <2.6   | 2.6              | M,U | 2.3  | 50  |
| PCB-206                            |              | 32.41          | 11.5   | 2.9              | М,З |      | 50  |
| PCB-209                            |              | 33.54          | 222    | 12               | В   |      | 50  |
| Extraction Standards               |              | Time           | % Rec  | Limita           |     |      |     |
| Extraction Standards               | pg           | Time           | % Rec  | Lillits          |     |      |     |
| 13C12-PCB-001                      | 2000         | 8.94           | 66     | 5-145            |     |      |     |
| 13C12-PCB-003                      | 2000         | 10.49          | 61     | 5-145            |     |      |     |
| 13C12-PCB-004                      | 2000         | 10.63          | 73     |                  |     |      |     |
| 13C12-PCB-015                      | 2000         | 14.32          | 62     | 5-145            |     |      |     |
| 13C12-PCB-019                      | 2000         | 12.62          | 70     | 5-145            |     |      |     |
| 13C12-PCB-037                      | 2000         | 18.26          | 71     |                  |     |      |     |
| 13C12-PCB-057                      | 2000         | 14.47          | 90     | 5-145            |     |      |     |
| 13C12-PCB-081                      | 2000         | 21.82          |        | 10-145           |     |      |     |
| 13C12-PCB-077                      | 2000         | 22.13          |        | 10-145           |     |      |     |
| 13C12-PCB-077                      | 2000         | 17.51          |        | 10-145           |     |      |     |
| 13C12-PCB-104                      | 2000         | 23.09          |        | 10-145           |     |      |     |
|                                    |              |                |        |                  |     |      |     |
| 13C12-PCB-118                      | 2000         | 23.26          |        | 10-145           |     |      |     |
| 13C12-PCB-114                      | 2000         | 23.56          |        | 10-145           |     |      |     |
| 13C12-PCB-105                      | 2000         | 23.91          |        | 10-145           |     |      |     |
| 13C12-PCB-126<br>13C12-PCB-155     | 2000         | 25.51<br>20.49 |        | 10-145           |     |      |     |
|                                    | 2000         |                |        | 10-145           |     |      |     |
| 13C12-PCB-167<br>13C12-PCB-156/157 | 2000<br>4000 | 26.39<br>27.02 |        | 10-145<br>10-145 |     |      |     |
| 13C12-PCB-150/157                  | 2000         | 28.69          |        | 10-145           |     |      |     |
| 13C12-PCB-188                      | 2000         |                |        |                  |     |      |     |
|                                    |              | 23.49          |        | 10-145           |     |      |     |
| 13C12-PCB-189                      | 2000         | 29.95          |        | 10-145           |     |      |     |
| 13C12-PCB-202                      | 2000         | 26.26          |        | 10-145           |     |      |     |
| 13C12-PCB-205                      | 2000         | 31.33          |        | 10-145           |     |      |     |
| 13C12-PCB-208                      | 2000         | 29.68          |        | 10-145           |     |      |     |
| 13C12-PCB-206                      | 2000         | 32.39          |        | 10-145           |     |      |     |
| 13C12-PCB-209                      | 2000         | 33.51          | 29     | 10-145           |     |      |     |
| Cleanup Standards                  |              |                |        |                  |     |      |     |
| 13C12-PCB-028                      | 2000         | 16.00          | ดูว    | 5-145            |     |      |     |
|                                    |              | 22.02          |        |                  |     |      |     |
| 13C12-PCB-111                      | 2000         |                |        | 10-145           |     |      |     |
| 13C12-PCB-178                      | 2000         | 25.06          | 113    | 10-145           |     |      |     |

#### **ALS Life Sciences Sample Analysis Report** Sampling Date ALS Sample ID L2526958-2 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B26 Run Date 01-Dec-20 03:48 Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 19.0 0.65 200 Total DiCB 400 528 1.5 Total TriCB 130 0.93 400 Total TetraCB Total PentaCB 235 0.35 0.85 800 264 800 Total HexaCB 0.84 Total HeptaCB 147 0.76 400 Total OctaCB 25.8 0.86 400 Total NonaCB 16.6 2.6 200 DecaCB 222 12 200 Total PCB 1870 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00218 Mid Point PCB TEO 0.179 Upper Bound PCB TEQ 0.355 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that the analyte was positively identifed. The associated numerical result is an estimate. Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

В

EMPC

## Sample Analysis Report

 Sample Name
 BA-3-BLANK

 ALS Sample ID
 L2526958-3

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

 Sampling Date
 3-Nov-20

 Extraction Date
 25-Nov-20

 Sample Size
 1

 Percent Moisture
 n/a

 Split Ratio
 2

1 Sample e n/a

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011 3∪823

 Run Date
 01-Dec-2∪1:42

 Final Volume
 25
 u

 Dilution Factor
 1
 u

 Analysis Units
 pg
 u

|                                | TEF        | Ret.             | Conc.          | EDL          |            | EMPC |          |
|--------------------------------|------------|------------------|----------------|--------------|------------|------|----------|
| Target Analytes                | (WHO 2005) | Time             | pg pg          |              | lags       | pg   | LQL      |
|                                | ,          |                  |                |              |            |      |          |
| PCB-001<br>PCB-002             |            | 8.94<br>10.37    | 2.28<br>3.29   | 0.50<br>0.60 | М,Ј,В<br>Ј |      | 50<br>50 |
| PCB-002<br>PCB-003             |            | 10.37            | 3.29<br>4.51   | 0.66         | j          |      | 50<br>50 |
| PCB-004                        |            | NotFnd           | <3.4           | 3.4          | Ú          |      | 50       |
| PCB-010                        |            | NotFnd           | <2.3           | 2.3          | U          |      | 50       |
| PCB-009                        |            | NotFnd           | <2.3           | 2.3          | U          |      | 50       |
| PCB-007                        |            | NotFnd           | <2.2           | 2.2          | U          |      | 50       |
| PCB-006                        |            | NotFnd           | <2.3           | 2.3          | U          |      | 50       |
| PCB-005                        |            | NotFnd           | <2.6           | 2.6          | U          |      | 50       |
| PCB-008                        |            | NotFnd           | <2.1           | 2.1          | U          |      | 50       |
| PCB-014                        |            | NotFnd           | <2.9           | 2.9          | U          |      | 50       |
| PCB-011                        |            | 13.97<br>NotEnd  | 46.0           | 2.9          | J          |      | 50       |
| PCB-012/013<br>PCB-015         |            | NotFnd<br>NotFnd | <3.0<br><3.6   | 3.0<br>3.6   | U          |      | 50<br>50 |
| PCB-019                        |            | NotFnd           | <1.3           | 1.3          | U          |      | 50       |
| PCB-018/030                    |            | 13.73            | <4.0           | 1.3          | J,R        | 4.0  | 50       |
| PCB-017                        |            | 13.98            | <1.6           | 1.6          | J,R        | 1.6  | 50       |
| PCB-027                        |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-024                        |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-016                        |            | 14.29            | <1.9           | 1.9          | J,R        | 1.9  | 50       |
| PCB-032                        |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-034                        |            | NotFnd           | <1.3           | 1.3          | U          |      | 50<br>50 |
| PCB-023<br>PCB-026/029         |            | NotFnd<br>NotFnd | <1.2<br><1.2   | 1.2<br>1.2   | U          |      | 50<br>50 |
| PCB-025/029                    |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-031                        |            | 15.85            | 7.47           | 1.1          | J,B        |      | 50       |
| PCB-020/028                    |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-021/033                    |            | 16.17            | 5.22           | 1.2          | J          |      | 50       |
| PCB-022                        |            | 16.39            | <2.0           | 1.3          | J,R        | 2.0  | 50       |
| PCB-036                        |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-039                        |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-038                        |            | NotFnd           | <1.3           | 1.3          | U          |      | 50       |
| PCB-035<br>PCB-037             |            | NotFnd<br>18.30  | <1.4<br><3.0   | 1.4<br>1.8   | U<br>M,J,R | 3.0  | 50<br>50 |
| PCB-037<br>PCB-054             |            | NotFnd           | < 0.58         | 0.58         | м,л,к<br>U | 5.0  | 50       |
| PCB-054<br>PCB-050/053         |            | NotFnd           | <1.5           | 1.5          | U          |      | 50       |
| PCB-045/051                    |            | 16.10            | 2.05           | 1.5          | J,B        |      | 50       |
| PCB-046                        |            | NotFnd           | <1.8           | 1.8          | U          |      | 50       |
| PCB-052                        |            | 17.00            | <5.2           | 1.6          | M,J,R      | 5.2  | 50       |
| PCB-073                        |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-043                        |            | NotFnd           | <2.0           | 2.0          | U          |      | 50       |
| PCB-049/069                    |            | 17.27            | 2.57           | 1.4          | J          |      | 50       |
| PCB-048<br>PCB-044/047/065     |            | NotFnd<br>17.56  | <1.6<br><6.4   | 1.6<br>1.5   | U<br>J,R   | 6.4  | 50<br>50 |
| PCB-059/062/075                |            | NotFnd           | <1.2           | 1.2          | J,K<br>U   | 0.4  | 50       |
| PCB-042                        |            | 17.86            | <1.8           | 1.8          |            | 0.92 | 50       |
| PCB-040/041/071                |            | 18.12            | <1.8           | 1.7          |            | 1.8  | 50       |
| PCB-064                        |            | 18.26            | <2.0           | 1.2          | J,R        |      | 50       |
| PCB-072                        |            | NotFnd           | < 0.92         | 0.92         | U          |      | 50       |
| PCB-068                        |            | NotFnd           | <0.86          | 0.86         | U          |      | 50       |
| PCB-057                        |            | NotFnd           | <0.98          | 0.98         | U          |      | 50       |
| PCB-058                        |            | NotFnd           | < 0.89         | 0.89         | U          |      | 50       |
| PCB-067                        |            | NotFnd<br>NotFnd | < 0.82         | 0.82         | U          |      | 50<br>50 |
| PCB-063<br>PCB-061/070/074/076 |            | NotFnd<br>19.61  | <0.91<br>6.47  | 0.91<br>0.93 | U<br>K,M   |      | 50<br>50 |
| PCB-001/070/074/070            |            | 19.78            | <2.4           | 0.92         | J,R        | 2.4  | 50       |
| PCB-055                        |            | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-056                        |            | 20.16            | <3.5           | 1.0          | M,J,R      | 3.5  | 50       |
| PCB-060                        |            | NotFnd           | < 0.99         | 0.99         | Ü          |      | 50       |
| PCB-080                        |            | NotFnd           | <0.86          | 0.86         | U          |      | 50       |
| PCB-079                        |            | NotFnd           | < 0.91         | 0.91         | U          |      | 50       |
| PCB-078                        |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-081                        | 0.0003     | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-077                        | 0.0001     | NotFnd           | <1.3           | 1.3          | U          |      | 50       |
| PCB-104<br>PCB-096             |            | NotFnd<br>NotFnd | <0.87<br><0.87 | 0.87<br>0.87 | U          |      | 50<br>50 |
| PCB-096<br>PCB-103             |            | NotFnd<br>NotFnd | <0.87<br><1.5  | 1.5          | U          |      | 50       |
| PCB-103<br>PCB-094             |            | NotFnd           | <1.7           | 1.7          | U          |      | 50       |
| PCB-095                        |            | 19.13            | <2.7           | 1.6          | M,J,R      | 2.7  | 50       |
| PCB-093/098/100/102            |            | NotFnd           | <1.6           | 1.6          | U          |      | 50       |

## Sample Analysis Report

 Sample Name
 BA-3-BLANK

 ALS Sample ID
 L2526958-3

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Sample Size 1
Percent Moisture n/a
Split Ratio 2

Sample

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011 3∪823

 Run Date
 01-Dec-2∪1:42

 Final Volume
 25
 u

 Dilution Factor
 1
 u

 Analysis Units
 pg
 u

|                                | TEF               | Ret.             | Conc.          | EDL          |              | EMPC |           |
|--------------------------------|-------------------|------------------|----------------|--------------|--------------|------|-----------|
| Target Analytes                | TEF<br>(WHO 2005) | Ret.<br>Time     | Conc.<br>pg    | PG F         | lags         | Pg   | LQL       |
|                                |                   |                  |                |              |              |      |           |
| PCB-088/091<br>PCB-084         |                   | NotFnd<br>NotFnd | <1.7<br><1.9   | 1.7<br>1.9   | U            |      | 50<br>50  |
| PCB-089                        |                   | NotFnd           | <1.9           | 1.9          | U            |      | 50        |
| PCB-121                        |                   | NotFnd           | <1.3           | 1.3          | U            |      | 50        |
| PCB-092                        |                   | NotFnd           | <1.9           | 1.9          | U            |      | 50        |
| PCB-090/101/113                |                   | 20.65            | <3.6           | 1.5          | M,J,R        |      | 50        |
| PCB-083/099<br>PCB-112         |                   | 20.96<br>NotFnd  | <1.9<br><1.3   | 1.9<br>1.3   | M,J,R<br>U   | 1.9  | 50<br>50  |
| PCB-086/087/097/109/119/125    |                   | NotFnd           | <1.6           | 1.6          | U            |      | 50        |
| PCB-085/110/115/116/117        |                   | 21.73            | <3.4           | 1.5          | J,R          | 3.4  | 50        |
| PCB-082                        |                   | NotFnd           | <2.4           | 2.4          | U            |      | 50        |
| PCB-111                        |                   | NotFnd           | <1.4           | 1.4          | U            |      | 50        |
| PCB-120                        |                   | NotFnd           | <1.4           | 1.4          | U            |      | 50        |
| PCB-108/124                    |                   | NotFnd           | <1.5           | 1.5          | U            |      | 50        |
| PCB-107                        | 0.00003           | NotFnd           | <1.3<br><1.6   | 1.3<br>1.6   | U            |      | 50<br>50  |
| PCB-123<br>PCB-106             | 0.00003           | NotFnd<br>NotFnd | <1.5<br><1.5   | 1.5          | U            |      | 50        |
| PCB-108                        | 0.00003           | NotFnd           | <1.5           | 1.5          | U            |      | 50        |
| PCB-122                        | 0.00003           | NotFnd           | <1.6           | 1.6          | U            |      | 50        |
| PCB-114                        | 0.00003           | NotFnd           | <1.5           | 1.5          | U            |      | 50        |
| PCB-105                        | 0.00003           | NotFnd           | <1.6           | 1.6          | U            |      | 50        |
| PCB-127                        |                   | NotFnd           | <1.6           | 1.6          | U            |      | 50        |
| PCB-126                        | 0.1               | 25.53            | <1.9           | 1.9          | M,U          | 1.3  | 50        |
| PCB-155                        |                   | NotFnd           | < 0.62         | 0.62         | U            |      | 50        |
| PCB-152<br>PCB-150             |                   | NotFnd<br>NotFnd | <0.60<br><0.57 | 0.60<br>0.57 | U            |      | 50<br>50  |
| PCB-136                        |                   | 20.98            | < 0.64         | 0.62         |              | 0.64 | 50        |
| PCB-145                        |                   | NotFnd           | < 0.62         | 0.62         | U            | 0.01 | 50        |
| PCB-148                        |                   | NotFnd           | <0.88          | 0.88         | U            |      | 50        |
| PCB-135/151                    |                   | NotFnd           | < 0.93         | 0.93         | U            |      | 50        |
| PCB-154                        |                   | NotFnd           | < 0.73         | 0.73         | U            |      | 50        |
| PCB-144                        |                   | NotFnd           | < 0.95         | 0.95         | U            |      | 50        |
| PCB-147/149                    |                   | 22.66            | <2.0           | 1.4          | J,R          | 2.0  | 50        |
| PCB-134/143                    |                   | NotFnd           | <1.7           | 1.7          | U            |      | 50        |
| PCB-139/140                    |                   | NotFnd           | <1.4           | 1.4          | U            |      | 50<br>50  |
| PCB-131<br>PCB-142             |                   | NotFnd<br>NotFnd | <1.7<br><1.7   | 1.7<br>1.7   | U            |      | 50        |
| PCB-142<br>PCB-132             |                   | NotFnd           | <1.7           | 1.6          | U            |      | 50        |
| PCB-133                        |                   | NotFnd           | <1.6           | 1.6          | U            |      | 50        |
| PCB-165                        |                   | NotFnd           | <1.2           | 1.2          | U            |      | 50        |
| PCB-146                        |                   | NotFnd           | <1.4           | 1.4          | U            |      | 50        |
| PCB-161                        |                   | NotFnd           | <1.2           | 1.2          | U            |      | 50        |
| PCB-153/168                    |                   | 24.19            | <2.5           | 1.2          | M,J,R        | 2.5  | 50        |
| PCB-141                        |                   | NotFnd           | <1.6           | 1.6          | U            |      | 50        |
| PCB-130<br>PCB-137/164         |                   | NotFnd<br>NotFnd | <1.9<br><1.4   | 1.9<br>1.4   | U<br>U       |      | 50<br>50  |
| PCB-13//164<br>PCB-129/138/163 |                   | NotFnd<br>24.88  | <1.4<br><3.3   | 1.4          | M,J,R        | 3.3  | 50        |
| PCB-129/138/103                |                   | NotFnd           | <1.3           | 1.3          | ۸,c,۱۰۱<br>U | 5.5  | 50        |
| PCB-158                        |                   | NotFnd           | <1.0           | 1.0          | U            |      | 50        |
| PCB-128/166                    |                   | NotFnd           | <1.4           | 1.4          | U            |      | 50        |
| PCB-159                        |                   | NotFnd           | <1.2           | 1.2          | U            |      | 50        |
| PCB-162                        |                   | NotFnd           | <1.3           | 1.3          | U            |      | 50        |
| PCB-167                        | 0.00003           | NotFnd           | <1.0           | 1.0          | U            |      | 50        |
| PCB-156/157                    | 0.00003           | NotFnd           | <1.4           | 1.4          | U            |      | 100<br>50 |
| PCB-169<br>PCB-188             | 0.03              | NotFnd<br>NotFnd | <1.3<br><0.63  | 1.3<br>0.63  | U            |      | 50<br>50  |
| PCB-188<br>PCB-179             |                   | NotFnd           | < 0.66         | 0.66         | U            |      | 50        |
| PCB-179                        |                   | NotFnd           | < 0.59         | 0.59         | U            |      | 50        |
| PCB-176                        |                   | NotFnd           | < 0.67         | 0.67         | U            |      | 50        |
| PCB-186                        |                   | NotFnd           | <0.68          | 0.68         | U            |      | 50        |
| PCB-178                        |                   | NotFnd           | <1.0           | 1.0          | U            |      | 50        |
| PCB-175                        |                   | NotFnd           | <1.0           | 1.0          | U            |      | 50        |
| PCB-187                        |                   | NotFnd           | < 0.85         | 0.85         | U            |      | 50        |
| PCB-182                        |                   | NotFnd           | < 0.93         | 0.93         | U            |      | 50        |
| PCB-183                        |                   | NotFnd           | < 0.94         | 0.94         | U            |      | 50        |
| PCB-185                        |                   | NotFnd           | <0.96          | 0.96         | U            |      | 50<br>50  |
| PCB-174<br>PCB-177             |                   | NotFnd<br>NotFnd | <1.0<br><1.1   | 1.0<br>1.1   | U            |      | 50<br>50  |
| PCB-177<br>PCB-181             |                   | NotFnd           | <1.1           | 1.0          | U            |      | 50        |
| PCB-171/173                    |                   | NotFnd           | <1.1           | 1.1          | U            |      | 50        |
| PCB-172                        |                   | NotFnd           | <1.1           | 1.1          | Ü            |      | 50        |

## Sample Analysis Report

 Sample Name
 BA-3-BLANK

 ALS Sample ID
 L2526958-3

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Sample Size 1 Sample
Percent Moisture n/a
Split Ratio 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-20113∪B23

 Run Date
 01-Dec-20 01:42

 Final Volume
 25
 ul

 Dilution Factor
 1

Analysis Units pg

|                                                 | TEF                  | Ret.                    | Conc.  | EDL                       |      | EMPC |     |
|-------------------------------------------------|----------------------|-------------------------|--------|---------------------------|------|------|-----|
| Target Analytes                                 | (WHO 2005)           | Time                    | pg     | pg F                      | lags | pg   | LQL |
|                                                 | •                    |                         |        |                           |      |      |     |
| PCB-192                                         |                      | NotFnd                  | < 0.85 | 0.85                      | U    |      | 50  |
| PCB-180/193                                     |                      | 27.70                   | <1.1   | 0.84                      | J,R  | 1.1  | 50  |
| PCB-191                                         |                      | NotFnd                  | < 0.72 | 0.72                      | U    |      | 50  |
| PCB-170                                         |                      | NotFnd                  | < 0.83 | 0.83                      | U    |      | 50  |
| PCB-190                                         |                      | NotFnd                  | < 0.52 | 0.52                      | U    |      | 50  |
| PCB-189                                         | 0.00003              | NotFnd                  | < 0.64 | 0.64                      | U    |      | 50  |
| PCB-202                                         |                      | NotFnd                  | < 0.97 | 0.97                      | U    |      | 50  |
| PCB-201                                         |                      | NotFnd                  | <1.0   | 1.0                       | U    |      | 50  |
| PCB-204                                         |                      | NotFnd                  | <1.0   | 1.0                       | U    |      | 50  |
| PCB-197                                         |                      | NotFnd                  | < 0.98 | 0.98                      | U    |      | 50  |
| PCB-200                                         |                      | NotFnd                  | <1.0   | 1.0                       | U    |      | 50  |
| PCB-198/199                                     |                      | 28.67                   | < 0.98 | 0.98                      | M,U  | 0.63 | 50  |
| PCB-196                                         |                      | NotFnd                  | < 0.96 | 0.96                      | Ū    |      | 50  |
| PCB-203                                         |                      | NotFnd                  | < 0.95 | 0.95                      | U    |      | 50  |
| PCB-195                                         |                      | NotFnd                  | < 0.95 | 0.95                      | U    |      | 50  |
| PCB-194                                         |                      | 31.06                   | 1.70   | 1.0                       | M,J  |      | 50  |
| PCB-205                                         |                      | NotFnd                  | < 0.92 | 0.92                      | U    |      | 50  |
| PCB-208                                         |                      | NotFnd                  | <2.0   | 2.0                       | U    |      | 50  |
| PCB-207                                         |                      | NotFnd                  | <2.0   | 2.0                       | U    |      | 50  |
| PCB-206                                         |                      | NotFnd                  | <2.8   | 2.8                       | U    |      | 50  |
| PCB-209                                         |                      | 33.53                   | 134    | 7.0                       | В    |      | 50  |
|                                                 |                      |                         |        |                           |      |      |     |
| Extraction Standards                            | pg                   | Time                    | % Rec  | Limits                    |      |      |     |
|                                                 |                      |                         |        |                           |      |      |     |
| 13C12-PCB-001                                   | 2000                 | 8.94                    | 56     |                           |      |      |     |
| 13C12-PCB-003                                   | 2000                 | 10.48                   | 48     | 5-145                     |      |      |     |
| 13C12-PCB-004                                   | 2000                 | 10.62                   | 56     | 5-145                     |      |      |     |
| 13C12-PCB-015                                   | 2000                 | 14.33                   | 50     | 5-145                     |      |      |     |
| 13C12-PCB-019                                   | 2000                 | 12.62                   | 56     | 5-145                     |      |      |     |
| 13C12-PCB-037                                   | 2000                 | 18.27                   | 53     | 5-145                     |      |      |     |
| 13C12-PCB-054                                   | 2000                 | 14.47                   |        | 5-145                     |      |      |     |
| 13C12-PCB-081                                   | 2000                 | 21.83                   | 63     | 10-145                    |      |      |     |
| 13C12-PCB-077                                   | 2000                 | 22.13                   | 63     | 10-145                    |      |      |     |
| 13C12-PCB-104                                   | 2000                 | 17.50                   | 75     | 10-145                    |      |      |     |
| 13C12-PCB-123                                   | 2000                 | 23.09                   | 61     | 10-145                    |      |      |     |
| 13C12-PCB-118                                   | 2000                 | 23.26                   | 62     | 10-145                    |      |      |     |
| 13C12-PCB-114                                   | 2000                 | 23.56                   | 64     | 10-145                    |      |      |     |
| 13C12-PCB-105                                   | 2000                 | 23.91                   | 65     | 10-145                    |      |      |     |
| 13C12-PCB-126                                   | 2000                 | 25.52                   | 60     | 10-145                    |      |      |     |
| 13C12-PCB-155                                   | 2000                 | 20.48                   | 52     | 10-145                    |      |      |     |
| 13C12-PCB-167                                   | 2000                 | 26.39                   | 71     | 10-145                    |      |      |     |
| 13C12-PCB-156/157                               | 4000                 | 27.03                   | 72     | 10-145                    |      |      |     |
| 13C12-PCB-169                                   | 2000                 | 28.69                   | 71     | 10-145                    |      |      |     |
| 13C12-PCB-188                                   | 2000                 | 23.48                   | 70     | 10-145                    |      |      |     |
| 13C12-PCB-189                                   | 2000                 | 29.95                   | 70     | 10-145                    |      |      |     |
| 13C12-PCB-202                                   | 2000                 | 26.26                   | 69     | 10-145                    |      |      |     |
| 13C12-PCB-205                                   | 2000                 | 31.33                   | 82     | 10-145                    |      |      |     |
| 13C12-PCB-208                                   | 2000                 | 29.67                   |        | 10-145                    |      |      |     |
| 13C12-PCB-206                                   | 2000                 | 32.39                   |        | 10-145                    |      |      |     |
| 13C12-PCB-209                                   | 2000                 | 33.51                   |        | 10-145                    |      |      |     |
| Cleanup Standards                               |                      |                         |        |                           |      |      |     |
|                                                 |                      |                         | _      |                           |      |      |     |
|                                                 |                      |                         |        |                           |      |      |     |
| 13C12-PCB-028                                   | 2000                 | 16.00                   | 64     |                           |      |      |     |
| 13C12-PCB-028<br>13C12-PCB-111<br>13C12-PCB-178 | 2000<br>2000<br>2000 | 16.00<br>22.02<br>25.06 | 67     | 5-145<br>10-145<br>10-145 |      |      |     |

#### **ALS Life Sciences Sample Analysis Report** BA-3-BLANK Sampling Date ALS Sample ID L2526958-3 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B23 01-Dec-20 01:42 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 10.1 0.50 200 Total DiCB 400 46.0 2.1 Total TriCB 400 Total TetraCB Total PentaCB 32.4 0.58 0.87 800 9.70 800 Total HexaCB Total HeptaCB 1.10 0.52 400 Total OctaCB 400 1.70 0.92 Total NonaCB 200 <2.0 2.0 DecaCB 134 7.0 200 Total PCB 265 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00 Mid Point PCB TEO 0.115 Upper Bound PCB TEQ 0.230 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that the analyte was positively identifed. The associated numerical result is an estimate. Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration. В Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

EMPC

## Sample Analysis Report

 Sample Name
 356-4

 ALS Sample ID
 L2526958-4

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-20113∪B27

 Run Date
 01-Dec-20 04:30

 Final Volume
 25
 u

 Dilution Factor
 1

Analysis Units pg

|                            | TEF        | Ret.             | Conc.          | EDL          |            | EMPC |          |
|----------------------------|------------|------------------|----------------|--------------|------------|------|----------|
| Target Analytes            | (WHO 2005) | Time             | pg pg          |              | lags       | pg   | LQL      |
|                            | ,          |                  |                |              |            |      |          |
| PCB-001<br>PCB-002         |            | 8.94<br>10.37    | <2.0<br>2.43   | 0.42<br>0.48 | M,J,R<br>J | 2.0  | 50<br>50 |
| PCB-002                    |            | 10.37            | 3.73           | 0.49         | j          |      | 50       |
| PCB-004                    |            | NotFnd           | <2.2           | 2.2          | U          |      | 50       |
| PCB-010                    |            | NotFnd           | <1.4           | 1.4          | U          |      | 50       |
| PCB-009                    |            | NotFnd           | <1.4           | 1.4          | U          |      | 50       |
| PCB-007<br>PCB-006         |            | NotFnd<br>NotFnd | <1.3<br><1.4   | 1.3<br>1.4   | U          |      | 50<br>50 |
| PCB-005                    |            | NotFnd           | <1.6           | 1.6          | U          |      | 50       |
| PCB-008                    |            | 12.44            | <7.1           | 1.3          | M,J,R      | 7.1  | 50       |
| PCB-014                    |            | NotFnd           | <1.7           | 1.7          | U          |      | 50       |
| PCB-011<br>PCB-012/013     |            | 13.96            | 69.1           | 1.7          |            |      | 50       |
| PCB-012/013<br>PCB-015     |            | NotFnd<br>14.33  | <1.8<br><3.6   | 1.8<br>2.0   | U<br>J,R   | 3.6  | 50<br>50 |
| PCB-019                    |            | NotFnd           | <1.0           | 1.0          | U          | 5.0  | 50       |
| PCB-018/030                |            | 13.73            | 7.35           | 0.97         | J,B        |      | 50       |
| PCB-017                    |            | 13.98            | <3.6           | 1.1          | M,J,R      | 3.6  | 50       |
| PCB-027                    |            | 14.11            | <0.85          | 0.85         | U          | 0.58 | 50       |
| PCB-024                    |            | NotFnd           | < 0.85         | 0.85         | U          |      | 50       |
| PCB-016<br>PCB-032         |            | 14.28<br>14.56   | 3.38<br>2.32   | 1.4<br>0.79  | j<br>j     |      | 50<br>50 |
| PCB-032                    |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-023                    |            | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-026/029                |            | 15.53            | 2.64           | 1.0          | J          |      | 50       |
| PCB-025                    |            | NotFnd           | < 0.91         | 0.91         | U          |      | 50       |
| PCB-031<br>PCB-020/028     |            | 15.85<br>NotFnd  | 12.9<br><1.0   | 0.95<br>1.0  | J,B<br>U   |      | 50<br>50 |
| PCB-021/033                |            | 16.15            | 10.2           | 0.99         | j          |      | 50       |
| PCB-022                    |            | 16.40            | 5.57           | 1.1          | J          |      | 50       |
| PCB-036                    |            | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-039                    |            | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-038<br>PCB-035         |            | NotFnd<br>18.04  | <1.1<br><1.2   | 1.1<br>1.2   | U          | 0.42 | 50<br>50 |
| PCB-037                    |            | 18.28            | 7.81           | 1.4          | j          | 0.72 | 50       |
| PCB-054                    |            | NotFnd           | < 0.44         | 0.44         | Ú          |      | 50       |
| PCB-050/053                |            | 15.69            | < 0.95         | 0.68         |            | 0.95 | 50       |
| PCB-045/051                |            | 16.10            | 2.39           | 0.71         | J,B        |      | 50       |
| PCB-046<br>PCB-052         |            | NotFnd<br>16.99  | <0.82<br>8.53  | 0.82<br>0.73 | U<br>J,B   |      | 50<br>50 |
| PCB-073                    |            | NotFnd           | < 0.54         | 0.54         | U          |      | 50       |
| PCB-043                    |            | NotFnd           | < 0.93         | 0.93         | U          |      | 50       |
| PCB-049/069                |            | 17.27            | 3.80           | 0.65         | J          |      | 50       |
| PCB-048                    |            | 17.44            | <1.6           | 0.74         | J,R        | 1.6  | 50       |
| PCB-044/047/065            |            | 17.57            | 9.65           | 0.68         | J,B        |      | 50       |
| PCB-059/062/075<br>PCB-042 |            | NotFnd<br>17.88  | <0.56<br>1.99  | 0.56<br>0.84 | U<br>M,J   |      | 50<br>50 |
| PCB-040/041/071            |            | 18.12            | 4.36           | 0.77         | M,J,B      |      | 50       |
| PCB-064                    |            | 18.25            | 3.22           | 0.56         | J          |      | 50       |
| PCB-072                    |            | NotFnd           | < 0.65         | 0.65         | U          |      | 50       |
| PCB-068                    |            | 18.81            | < 0.70         | 0.61         |            | 0.70 | 50       |
| PCB-057<br>PCB-058         |            | NotFnd<br>NotFnd | <0.69<br><0.63 | 0.69<br>0.63 | U          |      | 50<br>50 |
| PCB-058                    |            | NotFnd           | < 0.58         | 0.58         | U          |      | 50       |
| PCB-063                    |            | NotFnd           | < 0.64         | 0.64         | U          |      | 50       |
| PCB-061/070/074/076        |            | 19.61            | 10.1           | 0.66         | J          |      | 50       |
| PCB-066                    |            | 19.78            | <4.0           | 0.65         | J,R        | 4.0  | 50       |
| PCB-055<br>PCB-056         |            | NotFnd<br>20.16  | <0.71<br>8.91  | 0.71<br>0.71 | U<br>J,B   |      | 50<br>50 |
| PCB-060                    |            | 20.16            | 1.70           | 0.71         | J,B<br>J   |      | 50       |
| PCB-080                    |            | NotFnd           | < 0.61         | 0.61         | Ú          |      | 50       |
| PCB-079                    |            | NotFnd           | < 0.65         | 0.65         | U          |      | 50       |
| PCB-078                    |            | NotFnd           | <0.76          | 0.76         | U          |      | 50       |
| PCB-081                    | 0.0003     | NotFnd           | < 0.80         | 0.80         | U          |      | 50       |
| PCB-077<br>PCB-104         | 0.0001     | 22.14<br>NotFnd  | 1.89<br><0.87  | 0.87<br>0.87 | J<br>U     |      | 50<br>50 |
| PCB-104<br>PCB-096         |            | NotFnd           | < 0.83         | 0.83         | U          |      | 50       |
| PCB-103                    |            | NotFnd           | < 0.97         | 0.97         | U          |      | 50       |
| PCB-094                    |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-095                    |            | 19.13            | 3.63           | 1.0          | J          |      | 50       |
| PCB-093/098/100/102        |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |

## Sample Analysis Report

 Sample Name
 356-4

 ALS Sample ID
 L2526958-4

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 $\begin{array}{c|cccc} Run \ Information & Run \ I \\ \hline Fliename & 5-2011 \ 3D=27 \\ Run \ Date & 01-Dez \ 3D=27 \ 3D=27 \\ Final \ Volume & 25 \ ul \\ Dilution \ Factor & 1 \\ Analysis \ Units & pg \ \end{array}$ 

|                                        | TEF                | Ret.             | Conc.          | EDL          |            | ЕМРС |           |
|----------------------------------------|--------------------|------------------|----------------|--------------|------------|------|-----------|
| Target Analytes                        | (WHO 2005)         | Time             | conc.<br>pg    |              | lags       | Pg   | LQL       |
|                                        | /                  |                  |                |              |            |      |           |
| PCB-088/091<br>PCB-084                 |                    | NotFnd<br>19.74  | <1.1<br><2.1   | 1.1<br>1.2   | U<br>J,R   |      | 50<br>50  |
| PCB-089                                |                    | NotFnd           | <1.2           | 1.2          | J,K<br>U   |      | 50        |
| PCB-121                                |                    | NotFnd           | < 0.81         | 0.81         | U          |      | 50        |
| PCB-092                                |                    | NotFnd           | <1.2           | 1.2          | U          |      | 50        |
| PCB-090/101/113                        |                    | 20.64            | 6.47           | 0.98         | J,B        |      | 50        |
| PCB-083/099                            |                    | 20.97            | <2.2           | 1.2          | J,R        |      | 50<br>50  |
| PCB-112<br>PCB-086/087/097/109/119/125 |                    | NotFnd<br>21.25  | <0.85<br><6.0  | 0.85<br>1.0  | U<br>M,J,R |      | 50        |
| PCB-085/110/115/116/117                |                    | 21.23            | 8.71           | 0.96         | M,J        |      | 50        |
| PCB-082                                |                    | NotFnd           | <1.6           | 1.6          | U          |      | 50        |
| PCB-111                                |                    | NotFnd           | <0.88          | 0.88         | U          |      | 50        |
| PCB-120                                |                    | NotFnd           | <0.87          | 0.87         | U          |      | 50        |
| PCB-108/124                            |                    | NotFnd           | <1.2           | 1.2          | U          |      | 50        |
| PCB-107                                | 0.00003            | NotFnd           | <1.1<br><1.4   | 1.1          | U          |      | 50<br>50  |
| PCB-123<br>PCB-106                     | 0.00003            | NotFnd<br>NotFnd | <1.4<br><1.3   | 1.4<br>1.3   | U          |      | 50<br>50  |
| PCB-118                                | 0.00003            | 23.27            | 8.44           | 1.3          | J          |      | 50        |
| PCB-122                                | 3,0000             | NotFnd           | <1.4           | 1.4          | Ú          |      | 50        |
| PCB-114                                | 0.00003            | NotFnd           | <1.3           | 1.3          | U          |      | 50        |
| PCB-105                                | 0.00003            | 23.93            | 3.33           | 1.3          | J          |      | 50        |
| PCB-127                                |                    | NotFnd           | <1.4           | 1.4          | U          |      | 50        |
| PCB-126                                | 0.1                | 25.53            | <1.5           | 1.5          |            | 0.38 | 50        |
| PCB-155                                |                    | NotFnd           | < 0.73         | 0.73         | U          |      | 50        |
| PCB-152<br>PCB-150                     |                    | NotFnd<br>NotFnd | <0.46<br><0.45 | 0.46<br>0.45 | U          |      | 50<br>50  |
| PCB-136                                |                    | 20.98            | <1.0           | 0.45         | M,J,R      |      | 50        |
| PCB-145                                |                    | NotFnd           | <0.49          | 0.49         | U          |      | 50        |
| PCB-148                                |                    | NotFnd           | <0.68          | 0.68         | U          |      | 50        |
| PCB-135/151                            |                    | 22.18            | <1.4           | 0.73         | M,J,R      |      | 50        |
| PCB-154                                |                    | NotFnd           | < 0.57         | 0.57         | U          |      | 50        |
| PCB-144                                |                    | NotFnd           | < 0.74         | 0.74         | U          |      | 50        |
| PCB-147/149                            |                    | 22.66            | < 5.9          | 0.83         | J,R        |      | 50        |
| PCB-134/143                            |                    | NotFnd<br>NotFnd | <1.0           | 1.0          | U          |      | 50<br>50  |
| PCB-139/140<br>PCB-131                 |                    | NotFnd<br>NotFnd | <0.84<br><1.1  | 0.84<br>1.1  | U          |      | 50<br>50  |
| PCB-131<br>PCB-142                     |                    | NotFnd           | <1.1           | 1.0          | U          |      | 50        |
| PCB-132                                |                    | NotFnd           | <1.0           | 1.0          | U          |      | 50        |
| PCB-133                                |                    | NotFnd           | < 0.97         | 0.97         | U          |      | 50        |
| PCB-165                                |                    | NotFnd           | < 0.74         | 0.74         | U          |      | 50        |
| PCB-146                                |                    | 23.88            | <1.1           | 0.84         | J,R        |      | 50        |
| PCB-161                                |                    | NotFnd           | < 0.72         | 0.72         | U          |      | 50        |
| PCB-153/168                            |                    | 24.19            | 6.28           | 0.74         | J,B        |      | 50        |
| PCB-141<br>PCB-130                     |                    | 24.32<br>NotFnd  | 1.30<br><1.2   | 0.98<br>1.2  | J<br>U     |      | 50<br>50  |
| PCB-137/164                            |                    | NotFnd           | <0.85          | 0.85         | U          |      | 50        |
| PCB-129/138/163                        |                    | 24.88            | 11.4           | 0.97         | М,Ј,В      |      | 50        |
| PCB-160                                |                    | NotFnd           | < 0.78         | 0.78         | U          |      | 50        |
| PCB-158                                |                    | 25.06            | < 0.90         | 0.64         |            | 0.90 | 50        |
| PCB-128/166                            |                    | 25.53            | <0.88          | 0.88         | U          |      | 50        |
| PCB-159                                |                    | NotFnd           | < 0.75         | 0.75         | U          |      | 50        |
| PCB-162                                | 0.00003            | NotFnd           | < 0.78         | 0.78         | U          |      | 50        |
| PCB-167<br>PCB-156/157                 | 0.00003<br>0.00003 | NotFnd<br>27.02  | <0.62<br><2.1  | 0.62<br>0.84 | U<br>J,R   |      | 50<br>100 |
| PCB-130/137                            | 0.03               | NotFnd           | < 0.65         | 0.65         | J,K<br>U   |      | 50        |
| PCB-188                                |                    | NotFnd           | <0.58          | 0.58         | U          |      | 50        |
| PCB-179                                |                    | NotFnd           | <0.48          | 0.48         | U          |      | 50        |
| PCB-184                                |                    | NotFnd           | < 0.43         | 0.43         | U          |      | 50        |
| PCB-176                                |                    | NotFnd           | < 0.49         | 0.49         | U          |      | 50        |
| PCB-186                                |                    | NotFnd           | <0.50          | 0.50         | U          |      | 50        |
| PCB-178                                |                    | NotFnd           | < 0.74         | 0.74         | U          |      | 50        |
| PCB-175                                |                    | NotFnd           | < 0.73         | 0.73         | U          |      | 50        |
| PCB-187                                |                    | 25.52<br>NotEnd  | <1.6           | 0.63         |            | 1.6  | 50<br>50  |
| PCB-182<br>PCB-183                     |                    | NotFnd<br>NotFnd | <0.68<br><0.69 | 0.68<br>0.69 | U          |      | 50<br>50  |
| PCB-183<br>PCB-185                     |                    | NotFnd           | < 0.69         | 0.59         | U          |      | 50        |
| PCB-174                                |                    | 26.02            | < 0.84         | 0.74         |            | 0.84 | 50        |
| PCB-177                                |                    | 26.25            | < 0.81         | 0.79         |            | 0.81 | 50        |
| PCB-181                                |                    | NotFnd           | < 0.74         | 0.74         | U          |      | 50        |
| PCB-171/173                            |                    | NotFnd           | < 0.81         | 0.81         | U          |      | 50        |
| PCB-172                                |                    | NotFnd           | < 0.81         | 0.81         | U          |      | 50        |

## Sample Analysis Report

 Sample Name
 356-4

 ALS Sample ID
 L2526958-4

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information

 $\begin{array}{cccc} Filename & 5-201130B27 \\ Run Date & 01-0e^{-2}0 & 04:30 \\ Final Volume & 25 & u \\ Dilution Factor & 1 \\ Analysis Units & pg \\ \end{array}$ 

Instrument - Column HRMS-5 SPBOCTYL256001-01

Run 1

|                      | TEF        | Ret.           | Conc.  | EDL              |     | EMPC |     |
|----------------------|------------|----------------|--------|------------------|-----|------|-----|
| Target Analytes      | (WHO 2005) | Time           | pg     | pg Fl            | ags | pg   | LQL |
| PCB-192              |            | NotFnd         | < 0.62 | 0.62             | U   |      | 50  |
| PCB-180/193          |            | 27.68          | 4.89   | 0.61             | M,J |      | 50  |
| PCB-191              |            | NotFnd         | < 0.53 | 0.53             | U   |      | 50  |
| PCB-170              |            | 28.37          | < 0.78 | 0.61             | J,R | 0.78 | 50  |
| PCB-170              |            | NotFnd         | <0.78  | 0.38             | J,K | 0.70 | 50  |
| PCB-199              | 0.00003    | NotFnd         | <0.47  | 0.47             | U   |      | 50  |
| PCB-202              | 0.00003    | NotFnd         | < 0.47 | 0.87             | U   |      | 50  |
| PCB-201              |            | NotFnd         | <0.74  | 0.74             | U   |      | 50  |
|                      |            |                |        |                  |     |      |     |
| PCB-204              |            | NotFnd         | < 0.74 | 0.74             | U   |      | 50  |
| PCB-197              |            | NotFnd         | < 0.72 | 0.72             | U   |      | 50  |
| PCB-200              |            | NotFnd         | < 0.75 | 0.75             | U   |      | 50  |
| PCB-198/199          |            | NotFnd         | < 0.72 | 0.72             | U   |      | 50  |
| PCB-196              |            | NotFnd         | < 0.71 | 0.71             | U   |      | 50  |
| PCB-203              |            | NotFnd         | < 0.70 | 0.70             | U   |      | 50  |
| PCB-195              |            | NotFnd         | < 0.87 | 0.87             | U   |      | 50  |
| PCB-194              |            | 31.06          | <1.9   | 0.92             | J,R | 1.9  | 50  |
| PCB-205              |            | NotFnd         | < 0.71 | 0.71             | U   |      | 50  |
| PCB-208              |            | 29.69          | 3.43   | 2.2              | M,J |      | 50  |
| PCB-207              |            | 30.17          | <1.7   | 1.7              | J,R | 1.7  | 50  |
| PCB-206              |            | 32.43          | 4.34   | 1.9              | M,J |      | 50  |
| PCB-209              |            | 33.53          | 116    | 7.8              | В   |      | 50  |
|                      |            |                |        |                  |     |      |     |
| Extraction Standards | pg         | Time           | % Rec  | Limits           |     |      |     |
|                      |            |                |        |                  |     |      |     |
| 13C12-PCB-001        | 2000       | 8.94           | 52     |                  |     |      |     |
| 13C12-PCB-003        | 2000       | 10.48          | 51     | 5-145            |     |      |     |
| 13C12-PCB-004        | 2000       | 10.62          | 54     | 5-145            |     |      |     |
| 13C12-PCB-015        | 2000       | 14.32          | 51     | 5-145            |     |      |     |
| 13C12-PCB-019        | 2000       | 12.62          | 53     | 5-145            |     |      |     |
| 13C12-PCB-037        | 2000       | 18.26          | 57     | 5-145            |     |      |     |
| 13C12-PCB-054        | 2000       | 14.47          | 67     | 5-145            |     |      |     |
| 13C12-PCB-081        | 2000       | 21.82          | 70     | 10-145           |     |      |     |
| 13C12-PCB-077        | 2000       | 22.12          | 70     | 10-145           |     |      |     |
| 13C12-PCB-104        | 2000       | 17.50          | 83     | 10-145           |     |      |     |
| 13C12-PCB-123        | 2000       | 23.09          |        | 10-145           |     |      |     |
| 13C12-PCB-118        | 2000       | 23.26          |        | 10-145           |     |      |     |
| 13C12-PCB-114        | 2000       | 23.56          |        | 10-145           |     |      |     |
| 13C12-PCB-105        | 2000       | 23.91          |        | 10-145           |     |      |     |
| 13C12-PCB-126        | 2000       | 25.51          |        | 10-145           |     |      |     |
| 13C12-PCB-155        | 2000       | 20.48          |        | 10-145           |     |      |     |
| 13C12-PCB-167        | 2000       | 26.39          |        | 10-145           |     |      |     |
| 13C12-PCB-156/157    | 4000       | 27.02          |        | 10-145           |     |      |     |
| 13C12-PCB-169        | 2000       | 28.69          |        | 10-145           |     |      |     |
| 13C12-PCB-188        |            |                |        |                  |     |      |     |
| 13C12-PCB-189        | 2000       | 23.48<br>29.95 |        | 10-145<br>10-145 |     |      |     |
|                      | 2000       |                |        |                  |     |      |     |
| 13C12-PCB-202        | 2000       | 26.26          |        | 10-145           |     |      |     |
| 13C12-PCB-205        | 2000       | 31.33          |        | 10-145           |     |      |     |
| 13C12-PCB-208        | 2000       | 29.67          |        | 10-145           |     |      |     |
| 13C12-PCB-206        | 2000       | 32.39          |        | 10-145           |     |      |     |
| 13C12-PCB-209        | 2000       | 33.51          | 26     | 10-145           |     |      |     |
| Cleanup Standards    |            |                |        |                  |     |      |     |
| 13C12-PCB-028        | 2000       | 16.00          | 67     | 5-145            |     |      |     |
| 13C12-PCB-111        | 2000       | 22.01          |        | 10-145           |     |      |     |
| 13C12-PCB-171        | 2000       | 25.06          |        | 10-145           |     |      |     |
|                      |            |                | 0.1    | 10-140           |     |      |     |

#### **ALS Life Sciences Sample Analysis Report** Sampling Date ALS Sample ID L2526958-4 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B27 Run Date 01-Dec-20 04:30 Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 8.16 0.42 200 Total DiCB 400 79.8 1.3 Total TriCB 0.79 400 Total TetraCB Total PentaCB 63.8 0.44 800 0.81 800 40.9 Total HexaCB Total HeptaCB 8.92 0.38 400 Total OctaCB 400 1.90 0.70 Total NonaCB 200 DecaCB 116 7.8 200 Total PCB 414 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.000542 Mid Point PCB TEO 0.0855 Upper Bound PCB TEQ 0.170 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that the analyte was positively identifed. The associated numerical result is an estimate. Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration. В Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

EMPC

## Sample Analysis Report

**356-5** L2526958-5 ALS Sample ID Analysis Method EPA 1668C Analysis Type Sample Matrix Sample Swab

Sampling Date Extraction Date 25-Nov-20

Sample Size Percent Moisture Split Ratio Sample n/a

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information Run 1 Filename Run Date 5-201130B28 01-Dec-20 05:13 Final Volume 25 ul

Dilution Factor Analysis Units

pg HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                                    | TEF        | Ret.             | Conc.         | EDL          |              | EMPC |          |
|------------------------------------|------------|------------------|---------------|--------------|--------------|------|----------|
| Target Analytes                    | (WHO 2005) | Time             | pg            |              | Flags        | pg   | LQL      |
|                                    | · ·        |                  |               |              |              |      |          |
| PCB-001<br>PCB-002                 |            | 8.94<br>10.35    | <1.6<br><1.3  | 0.45<br>0.53 | M,J,R<br>J,R |      | 50<br>50 |
| PCB-002<br>PCB-003                 |            | 10.35            | <1.5<br><2.5  | 0.56         | J,R<br>J,R   |      | 50       |
| PCB-004                            |            | 10.63            | <2.8          | 2.2          | J,R          |      | 50       |
| PCB-010                            |            | NotFnd           | <1.5          | 1.5          | U            | -    | 50       |
| PCB-009                            |            | NotFnd           | <1.5          | 1.5          | U            |      | 50       |
| PCB-007                            |            | NotFnd           | <1.4          | 1.4          | U            |      | 50       |
| PCB-006                            |            | NotFnd           | <1.5          | 1.5          | U            |      | 50       |
| PCB-005                            |            | NotFnd           | <1.7          | 1.7          | U            |      | 50       |
| PCB-008                            |            | 12.43            | 8.58          | 1.4          | M,J,B        |      | 50       |
| PCB-014                            |            | NotFnd           | <2.0          | 2.0          | U            |      | 50       |
| PCB-011<br>PCB-012/013             |            | 13.95<br>NotFnd  | 77.6<br><2.0  | 2.0<br>2.0   | U            |      | 50<br>50 |
| PCB-012/013<br>PCB-015             |            | NotFnd           | <2.4          | 2.4          | U            |      | 50       |
| PCB-019                            |            | NotFnd           | <1.1          | 1.1          | Ü            |      | 50       |
| PCB-018/030                        |            | 13.73            | 8.54          | 1.3          | J,B          |      | 50       |
| PCB-017                            |            | 13.97            | 4.17          | 1.5          | j            |      | 50       |
| PCB-027                            |            | NotFnd           | <1.1          | 1.1          | U            |      | 50       |
| PCB-024                            |            | NotFnd           | <1.1          | 1.1          | U            |      | 50       |
| PCB-016                            |            | 14.27            | <4.0          | 1.8          | J,R          | 4.0  | 50       |
| PCB-032                            |            | 14.56            | 2.58          | 1.0          | J            |      | 50       |
| PCB-034                            |            | NotFnd           | <1.5          | 1.5          | U            |      | 50       |
| PCB-023<br>PCB-026/029             |            | NotFnd<br>15.53  | <1.4<br><1.4  | 1.4<br>1.4   | U            | 1.4  | 50<br>50 |
| PCB-025/029                        |            | NotFnd           | <1.4          | 1.3          | U            | 1.7  | 50       |
| PCB-031                            |            | 15.84            | 11.0          | 1.3          | J,B          |      | 50       |
| PCB-020/028                        |            | NotFnd           | <1.4          | 1.4          | U            |      | 50       |
| PCB-021/033                        |            | 16.15            | 8.53          | 1.4          | J            |      | 50       |
| PCB-022                            |            | 16.39            | 5.22          | 1.4          | J            |      | 50       |
| PCB-036                            |            | NotFnd           | <1.4          | 1.4          | U            |      | 50       |
| PCB-039                            |            | NotFnd           | <1.4          | 1.4          | U            |      | 50       |
| PCB-038                            |            | NotFnd           | <1.5          | 1.5          | U            |      | 50       |
| PCB-035<br>PCB-037                 |            | NotFnd<br>18.27  | <1.6<br><3.4  | 1.6<br>2.1   | M,J,R        | 3.4  | 50<br>50 |
| PCB-054                            |            | NotFnd           | < 0.55        | 0.55         | м,л,к<br>U   | 5.4  | 50       |
| PCB-050/053                        |            | 15.67            | 0.992         | 0.80         | j            |      | 50       |
| PCB-045/051                        |            | 16.09            | 2.46          | 0.84         | M,J,B        |      | 50       |
| PCB-046                            |            | NotFnd           | < 0.97        | 0.97         | U            |      | 50       |
| PCB-052                            |            | 16.98            | <7.6          | 0.86         |              | 7.6  | 50       |
| PCB-073                            |            | NotFnd           | < 0.64        | 0.64         | U            |      | 50       |
| PCB-043                            |            | NotFnd           | <1.1          | 1.1          | U            |      | 50       |
| PCB-049/069                        |            | 17.26            | <3.2          | 0.77         |              | 3.2  | 50       |
| PCB-048<br>PCB-044/047/065         |            | 17.43<br>17.55   | <0.90<br>8.19 | 0.87<br>0.80 | J,R<br>J,B   | 0.90 | 50<br>50 |
| PCB-044/047/065<br>PCB-059/062/075 |            | NotFnd           | < 0.66        | 0.66         | J,B<br>U     |      | 50       |
| PCB-042                            |            | 17.86            | <1.9          | 1.0          | J,R          | 1.9  | 50       |
| PCB-040/041/071                    |            | 18.12            | 4.83          | 0.91         | М,Ј,В        |      | 50       |
| PCB-064                            |            | 18.25            | 2.78          | 0.66         | j            |      | 50       |
| PCB-072                            |            | NotFnd           | <0.83         | 0.83         | U            |      | 50       |
| PCB-068                            |            | NotFnd           | < 0.78        | 0.78         | U            |      | 50       |
| PCB-057                            |            | NotFnd           | <0.89         | 0.89         | U            |      | 50       |
| PCB-058                            |            | NotFnd           | < 0.81        | 0.81         | U            |      | 50       |
| PCB-067                            |            | NotFnd<br>NotFnd | < 0.75        | 0.75         | U            |      | 50<br>50 |
| PCB-063<br>PCB-061/070/074/076     |            | NotFnd<br>19.60  | <0.82<br><8.4 | 0.82<br>0.84 | U<br>J,R     | 8.4  | 50<br>50 |
| PCB-061/070/074/076<br>PCB-066     |            | 19.60            | 5.26          | 0.84         | M,J          | 0.4  | 50       |
| PCB-055                            |            | NotFnd           | < 0.90        | 0.90         | U            |      | 50       |
| PCB-056                            |            | 20.16            | 8.41          | 0.92         | J,B          |      | 50       |
| PCB-060                            |            | 20.29            | 0.918         | 0.90         | j            |      | 50       |
| PCB-080                            |            | NotFnd           | < 0.78        | 0.78         | U            |      | 50       |
| PCB-079                            |            | NotFnd           | < 0.83        | 0.83         | U            |      | 50       |
| PCB-078                            |            | NotFnd           | <0.98         | 0.98         | U            |      | 50       |
| PCB-081                            | 0.0003     | NotFnd           | <1.1          | 1.1          | U            |      | 50       |
| PCB-077                            | 0.0001     | 22.13            | <1.5          | 1.2          |              | 1.5  | 50       |
| PCB-104                            |            | NotFnd           | < 0.90        | 0.90<br>0.90 | U            |      | 50<br>50 |
| PCB-096                            |            | NotFnd<br>NotFnd | <0.90<br><1.1 | 0.90         | U            |      | 50<br>50 |
|                                    |            |                  |               |              |              |      |          |
| PCB-103                            |            |                  |               |              |              |      |          |
|                                    |            | NotFnd<br>19.13  | <1.3<br>5.34  | 1.3          | U            |      | 50<br>50 |

## Sample Analysis Report

 Sample Name
 356-5

 ALS Sample ID
 L2526958-5

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run 1

 Filename
 5-2011 30 B≥8

 Run Date
 01-Dec-20 05:13

 Final Volume
 25 ul

 Dilution Factor
 1

 Analysis Units
 pg

|                             | TEF        | Ret.             | Conc.          | EDL          |            | ЕМРС |          |
|-----------------------------|------------|------------------|----------------|--------------|------------|------|----------|
| Target Analytes             | (WHO 2005) | Time             | pg             | pg F         | lags       | pg   | LQL      |
|                             |            |                  |                |              |            |      |          |
| PCB-088/091<br>PCB-084      |            | NotFnd<br>NotFnd | <1.2<br><1.4   | 1.2<br>1.4   | U          |      | 50<br>50 |
| PCB-089                     |            | NotFnd           | <1.4           | 1.4          | U          |      | 50       |
| PCB-121                     |            | NotFnd           | < 0.93         | 0.93         | U          |      | 50       |
| PCB-092                     |            | NotFnd           | <1.4           | 1.4          | U          |      | 50       |
| PCB-090/101/113             |            | 20.63            | 6.11           | 1.1          | J,B        |      | 50       |
| PCB-083/099<br>PCB-112      |            | 20.96<br>NotFnd  | <2.8<br><0.98  | 1.4<br>0.98  | J,R<br>U   |      | 50<br>50 |
| PCB-086/087/097/109/119/125 |            | 21.30            | <1.8           | 1.2          | M,J,R      |      | 50       |
| PCB-085/110/115/116/117     |            | 21.72            | 8.72           | 1.1          | M,J        | 210  | 50       |
| PCB-082                     |            | NotFnd           | <1.8           | 1.8          | U          |      | 50       |
| PCB-111                     |            | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-120                     |            | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-108/124<br>PCB-107      |            | NotFnd<br>NotFnd | <1.5<br><1.3   | 1.5<br>1.3   | U          |      | 50<br>50 |
| PCB-107                     | 0.00003    | NotFnd           | <1.7           | 1.7          | U          |      | 50       |
| PCB-106                     | 0.00005    | NotFnd           | <1.6           | 1.6          | U          |      | 50       |
| PCB-118                     | 0.00003    | 23.26            | <5.8           | 1.7          | J,R        | 5.8  | 50       |
| PCB-122                     |            | NotFnd           | <1.7           | 1.7          | U          |      | 50       |
| PCB-114                     | 0.00003    | NotFnd           | <1.6           | 1.6          | U          |      | 50       |
| PCB-105                     | 0.00003    | NotFnd           | <1.7           | 1.7          | U          |      | 50       |
| PCB-127<br>PCB-126          | 0.1        | NotFnd<br>NotFnd | <1.7<br><2.0   | 1.7<br>2.0   | U<br>U     |      | 50<br>50 |
| PCB-126<br>PCB-155          | 0.1        | NotFnd           | <0.75          | 0.75         | U          |      | 50       |
| PCB-152                     |            | NotFnd           | <0.58          | 0.58         | U          |      | 50       |
| PCB-150                     |            | NotFnd           | < 0.55         | 0.55         | U          |      | 50       |
| PCB-136                     |            | NotFnd           | < 0.60         | 0.60         | U          |      | 50       |
| PCB-145                     |            | NotFnd           | < 0.60         | 0.60         | U          |      | 50       |
| PCB-148                     |            | NotFnd           | <0.85          | 0.85         | U          |      | 50       |
| PCB-135/151                 |            | NotFnd           | < 0.90         | 0.90         | U          |      | 50       |
| PCB-154<br>PCB-144          |            | NotFnd<br>NotFnd | <0.70<br><0.92 | 0.70<br>0.92 | U          |      | 50<br>50 |
| PCB-147/149                 |            | 22.64            | <4.7           | 1.3          | J,R        | 4.7  | 50       |
| PCB-134/143                 |            | NotFnd           | <1.5           | 1.5          | U          |      | 50       |
| PCB-139/140                 |            | NotFnd           | <1.3           | 1.3          | U          |      | 50       |
| PCB-131                     |            | NotFnd           | <1.6           | 1.6          | U          |      | 50       |
| PCB-142                     |            | NotFnd           | <1.5           | 1.5          | U          |      | 50       |
| PCB-132                     |            | 23.36            | <2.8           | 1.5          | J,R        | 2.8  | 50       |
| PCB-133<br>PCB-165          |            | NotFnd<br>NotFnd | <1.5<br><1.1   | 1.5<br>1.1   | U<br>U     |      | 50<br>50 |
| PCB-146                     |            | NotFnd           | <1.1           | 1.3          | U          |      | 50       |
| PCB-161                     |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-153/168                 |            | 24.18            | 5.75           | 1.1          | J,B        |      | 50       |
| PCB-141                     |            | 24.31            | <1.5           | 1.5          | U          |      | 50       |
| PCB-130                     |            | NotFnd           | <1.8           | 1.8          | U          |      | 50       |
| PCB-137/164                 |            | 24.72            | <1.3           | 1.3          |            | 0.74 | 50       |
| PCB-129/138/163             |            | 24.88            | <8.3           | 1.5          | J,R        | 8.3  | 50       |
| PCB-160<br>PCB-158          |            | NotFnd<br>25.07  | <1.2<br><0.96  | 1.2<br>0.96  | U<br>U     | 0.73 | 50<br>50 |
| PCB-128/166                 |            | NotFnd           | <1.3           | 1.3          | U          | 0.75 | 50       |
| PCB-159                     |            | NotFnd           | <1.1           | 1.1          | U          |      | 50       |
| PCB-162                     |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-167                     | 0.00003    | NotFnd           | < 0.96         | 0.96         | U          |      | 50       |
| PCB-156/157                 | 0.00003    | NotFnd           | <1.3           | 1.3          | U          |      | 100      |
| PCB-169                     | 0.03       | NotFnd           | <1.0           | 1.0          | U          |      | 50       |
| PCB-188<br>PCB-179          |            | NotFnd           | < 0.89         | 0.89<br>0.83 | U<br>U     |      | 50<br>50 |
| PCB-179<br>PCB-184          |            | NotFnd<br>NotFnd | <0.83<br><0.75 | 0.83         | U          |      | 50       |
| PCB-176                     |            | NotFnd           | <0.75          | 0.75         | U          |      | 50       |
| PCB-186                     |            | NotFnd           | < 0.87         | 0.87         | U          |      | 50       |
| PCB-178                     |            | NotFnd           | <1.3           | 1.3          | U          |      | 50       |
| PCB-175                     |            | NotFnd           | <1.3           | 1.3          | U          |      | 50       |
| PCB-187                     |            | 25.53            | <2.0           | 1.1          |            | 2.0  | 50       |
| PCB-182                     |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-183                     |            | NotFnd           | <1.2           | 1.2          | U          |      | 50       |
| PCB-185                     |            | NotFnd           | <1.2           | 1.2          | U<br>M 1 D | 1 2  | 50<br>50 |
| PCB-174<br>PCB-177          |            | 26.00<br>NotFnd  | <1.3<br><1.4   | 1.3<br>1.4   | M,J,R<br>U | 1.3  | 50<br>50 |
| PCB-177                     |            | NotFnd           | <1.4           | 1.4          | U          |      | 50       |
| PCB-171/173                 |            | NotFnd           | <1.4           | 1.4          | U          |      | 50       |
| PCB-172                     |            | NotFnd           | <1.4           | 1.4          | Ü          |      | 50       |

## Sample Analysis Report

 Sample Name
 356-5

 ALS Sample ID
 L2526958-5

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 3-Nov-20 Extraction Date 25-Nov-20

| Sample | Sample | Percent Moisture | n/a | Split Ratio | 2 | |

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information Run 1

 $\begin{array}{cccc} Filename & 5-2011 3UB28 \\ Run Date & 01-0e^{-2}U 05:13 \\ Final Volume & 25 & ul \\ Dilution Factor & 1 \\ Analysis Units & pg \\ \end{array}$ 

|                                | TEF        | Ret.   | Conc.  | EDL    |          | EMPC |     |
|--------------------------------|------------|--------|--------|--------|----------|------|-----|
| Target Analytes                | (WHO 2005) | Time   | pg     | pg F   | lags     | pg   | LQL |
| PCB-192                        |            | NotFnd | <1.1   | 1.1    | U        |      | 50  |
| PCB-192<br>PCB-180/193         |            | 27.68  | <2.0   | 1.1    |          | 2.0  | 50  |
| PCB-180/193<br>PCB-191         |            |        | <0.91  | 0.91   | J,R<br>U | 2.0  | 50  |
|                                |            | NotFnd |        |        |          |      |     |
| PCB-170                        |            | 28.38  | 1.56   | 1.1    | J        |      | 50  |
| PCB-190                        |            | NotFnd | <0.66  | 0.66   | U        |      | 50  |
| PCB-189                        | 0.00003    | NotFnd | <0.57  | 0.57   | U        |      | 50  |
| PCB-202                        |            | NotFnd | <0.82  | 0.82   | U        |      | 50  |
| PCB-201                        |            | NotFnd | <0.80  | 0.80   | U        |      | 50  |
| PCB-204                        |            | NotFnd | < 0.79 | 0.79   | U        |      | 50  |
| PCB-197                        |            | NotFnd | < 0.77 | 0.77   | U        |      | 50  |
| PCB-200                        |            | NotFnd | < 0.81 | 0.81   | U        |      | 50  |
| PCB-198/199                    |            | NotFnd | < 0.77 | 0.77   | U        |      | 50  |
| PCB-196                        |            | NotFnd | < 0.76 | 0.76   | U        |      | 50  |
| PCB-203                        |            | NotFnd | < 0.75 | 0.75   | U        |      | 50  |
| PCB-195                        |            | NotFnd | < 0.89 | 0.89   | U        |      | 50  |
| PCB-194                        |            | 31.05  | <1.0   | 0.94   | J,R      | 1.0  | 50  |
| PCB-205                        |            | NotFnd | < 0.81 | 0.81   | U        |      | 50  |
| PCB-208                        |            | NotFnd | <2.1   | 2.1    | U        |      | 50  |
| PCB-207                        |            | NotFnd | <1.9   | 1.9    | U        |      | 50  |
| PCB-206                        |            | 32.39  | 7.41   | 2.4    | M,J      |      | 5   |
| PCB-209                        |            | 33.53  | <130   | 7.4    | R        | 130  |     |
|                                |            |        |        |        |          |      |     |
| <b>Extraction Standards</b>    | pg         | Time   | % Rec  | Limits |          |      |     |
|                                |            |        |        |        |          |      |     |
| 13C12-PCB-001                  | 2000       | 8.92   | 54     | 5-145  |          |      |     |
| 13C12-PCB-003                  | 2000       | 10.48  | 53     | 5-145  |          |      |     |
| 13C12-PCB-004                  | 2000       | 10.62  | 56     | 5-145  |          |      |     |
| 13C12-PCB-015                  | 2000       | 14.32  | 51     | 5-145  |          |      |     |
| 13C12-PCB-019                  | 2000       | 12.61  | 55     | 5-145  |          |      |     |
| 13C12-PCB-037                  | 2000       | 18.26  | 54     | 5-145  |          |      |     |
| 13C12-PCB-054                  | 2000       | 14.46  | 69     | 5-145  |          |      |     |
| 13C12-PCB-081                  | 2000       | 21.82  | 61     | 10-145 |          |      |     |
| 13C12-PCB-077                  | 2000       | 22.12  |        | 10-145 |          |      |     |
| 13C12-PCB-104                  | 2000       | 17.49  |        | 10-145 |          |      |     |
| 13C12-PCB-123                  | 2000       | 23.08  |        | 10-145 |          |      |     |
| 13C12-PCB-118                  | 2000       | 23.25  |        | 10-145 |          |      |     |
| 13C12-PCB-114                  | 2000       | 23.55  |        | 10-145 |          |      |     |
| 13C12-PCB-105                  | 2000       | 23.91  |        | 10-145 |          |      |     |
| 13C12-PCB-126                  | 2000       | 25.51  |        | 10-145 |          |      |     |
| 13C12-PCB-155                  | 2000       | 20.48  |        | 10-145 |          |      |     |
| 13C12-PCB-167                  | 2000       | 26.38  |        | 10-145 |          |      |     |
| 13C12-PCB-156/157              | 4000       | 27.02  |        | 10-145 |          |      |     |
| 13C12-PCB-169                  | 2000       | 28.67  |        | 10-145 |          |      |     |
| 13C12-PCB-188                  | 2000       | 23.48  |        | 10-145 |          |      |     |
| 13C12-PCB-189                  | 2000       | 29.93  |        | 10-145 |          |      |     |
| 13C12-PCB-189                  | 2000       | 26.25  |        | 10-145 |          |      |     |
|                                |            |        |        | 10-145 |          |      |     |
| 13C12-PCB-205<br>13C12-PCB-208 | 2000       | 31.31  |        |        |          |      |     |
|                                | 2000       | 29.67  |        | 10-145 |          |      |     |
| 13C12-PCB-206                  | 2000       | 32.39  |        | 10-145 |          |      |     |
| 13C12-PCB-209                  | 2000       | 33.50  | 27     | 10-145 |          |      |     |
| Cleanup Standards              |            |        |        |        |          |      |     |
| 13C12-PCB-028                  | 2000       | 16.00  | 65     | 5-145  |          |      |     |
| 13C12-PCB-111                  | 2000       | 22.01  |        | 10-145 |          |      |     |
| 13C12-PCB-178                  | 2000       | 25.05  |        | 10-145 |          |      |     |
|                                |            |        |        |        |          |      |     |

#### **ALS Life Sciences Sample Analysis Report** Sampling Date ALS Sample ID L2526958-5 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B28 01-Dec-20 05:13 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 5.40 0.45 200 Total DiCB 400 89.0 1.4 Total TriCB 47.4 400 Total TetraCB Total PentaCB 57.3 30.6 0.55 0.90 800 800 Total HexaCB Total HeptaCB 5.56 0.57 400 Total OctaCB 1.00 400 0.75 Total NonaCB 200 1.9 DecaCB 130 7.4 200 Total PCB 395 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00 Mid Point PCB TEO 0.116 Upper Bound PCB TEQ 0.231 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that the analyte was positively identifed. The associated numerical result is an estimate. Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

В

EMPC

## Sample Analysis Report

ENG-558-DFP-02 ALS Sample ID L2526958-6 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: E. Sabljic --e-signature--01-Dec-2020 Sample Size Percent Moisture Sample n/a Split Ratio

Run Information Run 1 Filename Run Date 5-201130B29 01-Dec-20 05:55 Final Volume 25 ul Dilution Factor Analysis Units pg

|                                    | TEF        | Ret.            | Conc.         | EDL          |            | ЕМРС |          |
|------------------------------------|------------|-----------------|---------------|--------------|------------|------|----------|
| Target Analytes                    | (WHO 2005) | Time            | pg            |              | Flags      | pg   | LQL      |
|                                    | ,          |                 |               |              |            |      |          |
| PCB-001<br>PCB-002                 |            | 8.99<br>10.41   | <1.4<br>4.04  | 1.3<br>0.73  | M,J,R<br>J | 1.4  | 50<br>50 |
| PCB-002<br>PCB-003                 |            | 10.41           | 5.05          | 0.73         | )          |      | 50       |
| PCB-004                            |            | 10.68           | <4.0          | 1.6          | J,R        | 4.0  | 50       |
| PCB-010                            |            | NotFnd          | < 0.99        | 0.99         | U          |      | 50       |
| PCB-009                            |            | NotFnd          | <1.0          | 1.0          | U          |      | 50       |
| PCB-007                            |            | 12.02           | 4.69          | 0.97         | J          |      | 50       |
| PCB-006                            |            | 12.18           | <3.5          | 1.0          | J,R        | 3.5  | 50       |
| PCB-005<br>PCB-008                 |            | NotFnd<br>12.46 | <1.1<br>20.5  | 1.1<br>0.92  | U<br>M 1 B |      | 50<br>50 |
| PCB-008<br>PCB-014                 |            | NotFnd          | <1.7          | 1.7          | M,J,B<br>U |      | 50       |
| PCB-011                            |            | 13.95           | 762           | 1.7          | Ü          |      | 50       |
| PCB-012/013                        |            | 14.14           | <10           | 1.7          | J,R        | 10   | 50       |
| PCB-015                            |            | 14.33           | 20.8          | 1.9          | J          |      | 50       |
| PCB-019                            |            | 12.65           | <2.3          | 0.79         | J,R        | 2.3  | 50       |
| PCB-018/030                        |            | 13.74           | 26.5          | 0.59         | J,B        |      | 50       |
| PCB-017<br>PCB-027                 |            | 13.98           | 13.1<br><1.1  | 0.69<br>0.52 | J<br>1 R   | 1.1  | 50<br>50 |
| PCB-027<br>PCB-024                 |            | 14.13<br>NotFnd | <1.1<br><0.52 | 0.52         | J,R<br>U   | 1.1  | 50       |
| PCB-024<br>PCB-016                 |            | 14.28           | <13           | 0.83         | M,J,R      | 13   | 50       |
| PCB-032                            |            | 14.55           | 10.8          | 0.48         | 3          |      | 50       |
| PCB-034                            |            | NotFnd          | <1.0          | 1.0          | U          |      | 50       |
| PCB-023                            |            | NotFnd          | < 0.97        | 0.97         | U          |      | 50       |
| PCB-026/029                        |            | 15.52           | 8.75          | 0.97         | J          |      | 50       |
| PCB-025                            |            | 15.65           | <4.4          | 0.88         | J,R        | 4.4  | 50       |
| PCB-031<br>PCB-020/028             |            | 15.84<br>16.01  | 53.6<br>74.6  | 0.91<br>0.97 | В          |      | 50<br>50 |
| PCB-021/033                        |            | 16.01           | 43.5          | 0.97         | J          |      | 50       |
| PCB-022                            |            | 16.39           | 28.1          | 1.0          | j          |      | 50       |
| PCB-036                            |            | 17.22           | <4.0          | 0.97         | J,R        | 4.0  | 50       |
| PCB-039                            |            | 17.44           | < 0.99        | 0.99         | U          | 0.36 | 50       |
| PCB-038                            |            | NotFnd          | <1.1          | 1.1          | U          |      | 50       |
| PCB-035                            |            | 18.03           | <12           | 1.1          | J,R        | 12   | 50       |
| PCB-037                            |            | 18.26<br>NotEnd | 36.2          | 1.4          | J          |      | 50<br>50 |
| PCB-054<br>PCB-050/053             |            | NotFnd<br>15.68 | <0.30<br>6.03 | 0.30<br>0.56 | U          |      | 50<br>50 |
| PCB-045/051                        |            | 16.09           | 12.1          | 0.59         | J,B        |      | 50       |
| PCB-046                            |            | 16.27           | 2.97          | 0.68         | J          |      | 50       |
| PCB-052                            |            | 16.99           | 65.2          | 0.60         |            |      | 50       |
| PCB-073                            |            | NotFnd          | <0.45         | 0.45         | U          |      | 50       |
| PCB-043                            |            | 17.10           | <1.2          | 0.78         | J,R        | 1.2  | 50       |
| PCB-049/069                        |            | 17.26           | 27.4          | 0.54         | J          |      | 50       |
| PCB-048                            |            | 17.43           | 11.2<br>66.8  | 0.61<br>0.56 | J          |      | 50<br>50 |
| PCB-044/047/065<br>PCB-059/062/075 |            | 17.56<br>17.74  | 4.84          | 0.56         | J          |      | 50       |
| PCB-039/002/073                    |            | 17.74           | 16.2          | 0.70         | 3          |      | 50       |
| PCB-040/041/071                    |            | 18.13           | 34.1          | 0.64         | J          |      | 50       |
| PCB-064                            |            | 18.24           | 27.1          | 0.47         | J          |      | 50       |
| PCB-072                            |            | NotFnd          | <0.86         | 0.86         | U          |      | 50       |
| PCB-068                            |            | 18.80           | 4.51          | 0.81         | J          |      | 50       |
| PCB-057<br>PCB-058                 |            | NotFnd          | < 0.92        | 0.92<br>0.84 | U          |      | 50       |
| PCB-058<br>PCB-067                 |            | 19.14<br>19.25  | 1.67<br>1.68  | 0.84         | )          |      | 50<br>50 |
| PCB-063                            |            | 19.40           | <1.8          | 0.85         |            | 1.8  | 50       |
| PCB-061/070/074/076                |            | 19.59           | 105           | 0.87         | -,         | -    | 50       |
| PCB-066                            |            | 19.76           | 58.3          | 0.86         |            |      | 50       |
| PCB-055                            |            | 19.87           | 2.45          | 0.93         | J          |      | 50       |
| PCB-056                            |            | 20.15           | 39.0          | 0.94         | J          |      | 50       |
| PCB-060                            |            | 20.27           | <20           | 0.93         | J,R        | 20   | 50       |
| PCB-080                            |            | NotFnd          | < 0.81        | 0.81         | U          | 1.2  | 50       |
| PCB-079<br>PCB-078                 |            | 21.27<br>NotFnd | <1.2<br><1.0  | 0.85<br>1.0  | J,R<br>U   | 1.2  | 50<br>50 |
| PCB-078                            | 0.0003     | NotFnd          | <1.0          | 1.1          | U          |      | 50       |
| PCB-077                            | 0.0001     | 22.12           | 14.3          | 1.2          | j          |      | 50       |
| PCB-104                            |            | NotFnd          | <0.48         | 0.48         | U          |      | 50       |
| PCB-096                            |            | NotFnd          | < 0.49        | 0.49         | U          |      | 50       |
| PCB-103                            |            | NotFnd          | <0.87         | 0.87         | U          |      | 50       |
| PCB-094                            |            | NotFnd          | <1.0          | 1.0          | U          |      | 50       |
| PCB-095                            |            | 19.13           | 49.5          | 0.91         | J<br>M 1   |      | 50<br>50 |
| PCB-093/098/100/102                |            | 19.29           | 3.25          | 0.95         | M,J        |      | 50       |

## **Sample Analysis Report**

 Sample Name
 ENG-558-DFP-02

 ALS Sample ID
 L2526958-6

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1
Percent Moisture n/a
Split Ratio 2

Sample

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011 3∪829

 Run Date
 01-Dec-2∪ 5:55

 Final Volume
 25
 u

 Dilution Factor
 1
 u

 Analysis Units
 pg
 u

 Analysis Units
 pg

 Instrument - Column
 HRMS-5
 SPBOCTYL256001-01

|                             | TEF        | Ret.             | Conc.          | EDL          |          | EMPC |          |
|-----------------------------|------------|------------------|----------------|--------------|----------|------|----------|
| Target Analytes             | (WHO 2005) | Time             | conc.<br>pg    |              | lags     | Pg   | LQL      |
|                             |            |                  |                |              |          |      |          |
| PCB-088/091<br>PCB-084      |            | 19.58<br>19.74   | 10.1<br>19.5   | 0.97<br>1.1  | j<br>j   |      | 50<br>50 |
| PCB-089                     |            | NotFnd           | <1.1           | 1.1          | U        |      | 50       |
| PCB-121                     |            | NotFnd           | < 0.73         | 0.73         | U        |      | 50       |
| PCB-092                     |            | 20.33            | 12.9           | 1.1          | J        |      | 50       |
| PCB-090/101/113             |            | 20.63            | 77.5           | 0.88         |          |      | 50       |
| PCB-083/099<br>PCB-112      |            | 20.95<br>NotFnd  | 43.0<br><0.77  | 1.1<br>0.77  | J<br>U   |      | 50<br>50 |
| PCB-086/087/097/109/119/125 |            | 21.30            | 65.4           | 0.77         | М        |      | 50       |
| PCB-085/110/115/116/117     |            | 21.71            | 136            | 0.87         | М        |      | 50       |
| PCB-082                     |            | 21.92            | 14.5           | 1.4          | M,J      |      | 50       |
| PCB-111                     |            | NotFnd           | < 0.79         | 0.79         | U        |      | 50       |
| PCB-120<br>PCB-108/124      |            | NotFnd<br>22.89  | <0.78<br>3.13  | 0.78<br>1.0  | U<br>J   |      | 50<br>50 |
| PCB-107                     |            | 23.03            | <4.6           | 0.91         | M,J,R    |      | 50       |
| PCB-123                     | 0.00003    | 23.07            | 1.76           | 1.2          | М,Ј      |      | 50       |
| PCB-106                     |            | NotFnd           | <1.1           | 1.1          | U        |      | 50       |
| PCB-118                     | 0.00003    | 23.26            | 97.6           | 1.1          |          |      | 50       |
| PCB-122<br>PCB-114          | 0.00003    | NotFnd<br>23.56  | <1.2<br>2.55   | 1.2<br>1.1   | U<br>J   |      | 50<br>50 |
| PCB-105                     | 0.00003    | 23.91            | 44.8           | 1.1          | j        |      | 50       |
| PCB-127                     |            | NotFnd           | <1.1           | 1.1          | U        |      | 50       |
| PCB-126                     | 0.1        | 25.52            | <2.1           | 1.4          | M,J,R    |      | 50       |
| PCB-155                     |            | 20.49            | <2.4           | 0.38         | J,R      |      | 50       |
| PCB-152<br>PCB-150          |            | NotFnd<br>NotFnd | <0.40<br><0.39 | 0.40<br>0.39 | U        |      | 50<br>50 |
| PCB-136                     |            | 20.96            | 9.67           | 0.42         | j        |      | 50       |
| PCB-145                     |            | NotFnd           | < 0.42         | 0.42         | U        |      | 50       |
| PCB-148                     |            | NotFnd           | < 0.60         | 0.60         | U        |      | 50       |
| PCB-135/151                 |            | 22.16            | 29.4           | 0.63         | J        |      | 50       |
| PCB-154<br>PCB-144          |            | NotFnd<br>22.45  | <0.49<br>3.69  | 0.49<br>0.65 | U<br>J   |      | 50<br>50 |
| PCB-147/149                 |            | 22.64            | 84.9           | 0.91         | ,        |      | 50       |
| PCB-134/143                 |            | 22.79            | 5.77           | 1.1          | J        |      | 50       |
| PCB-139/140                 |            | 22.95            | 2.70           | 0.92         | J        |      | 50       |
| PCB-131                     |            | NotFnd           | <1.2           | 1.2          | U        |      | 50       |
| PCB-142<br>PCB-132          |            | NotFnd<br>23.35  | <1.1<br>45.3   | 1.1<br>1.1   | U        |      | 50<br>50 |
| PCB-132<br>PCB-133          |            | 23.35            | 45.3<br><1.1   | 1.1          | U        |      | 50<br>50 |
| PCB-165                     |            | NotFnd           | <0.82          | 0.82         | U        |      | 50       |
| PCB-146                     |            | 23.87            | 13.5           | 0.92         | J        |      | 50       |
| PCB-161                     |            | NotFnd           | <0.78          | 0.78         | U        |      | 50       |
| PCB-153/168                 |            | 24.18            | 83.9           | 0.81         | ,        |      | 50       |
| PCB-141<br>PCB-130          |            | 24.31<br>24.53   | 24.3<br><7.4   | 1.1<br>1.3   | J<br>J,R |      | 50<br>50 |
| PCB-137/164                 |            | 24.70            | 15.9           | 0.93         | M,J      |      | 50       |
| PCB-129/138/163             |            | 24.87            | 144            | 1.1          |          |      | 50       |
| PCB-160                     |            | NotFnd           | <0.86          | 0.86         | U        |      | 50       |
| PCB-158                     |            | 25.07            | 14.6           | 0.70         | J        |      | 50       |
| PCB-128/166<br>PCB-159      |            | 25.57<br>26.00   | 20.7<br><0.82  | 0.96<br>0.82 | J<br>U   |      | 50<br>50 |
| PCB-162                     |            | NotFnd           | < 0.86         | 0.86         | U        |      | 50       |
| PCB-167                     | 0.00003    | 26.39            | 5.21           | 0.74         | j        |      | 50       |
| PCB-156/157                 | 0.00003    | 27.02            | 13.5           | 1.0          | J,B      |      | 100      |
| PCB-169                     | 0.03       | NotFnd           | < 0.84         | 0.84         | U        |      | 50<br>50 |
| PCB-188<br>PCB-179          |            | NotFnd<br>23.70  | <0.77<br>8.09  | 0.77<br>0.82 | U<br>J   |      | 50<br>50 |
| PCB-179                     |            | 23.94            | <3.0           | 0.74         |          | 3.0  | 50       |
| PCB-176                     |            | 24.16            | 2.64           | 0.84         | ,<br>J   |      | 50       |
| PCB-186                     |            | NotFnd           | <0.86          | 0.86         | U        |      | 50       |
| PCB-178                     |            | 25.06            | 5.18           | 1.3          | J        |      | 50       |
| PCB-175<br>PCB-187          |            | NotFnd<br>25.53  | <1.3<br>24.4   | 1.3<br>1.1   | U        |      | 50<br>50 |
| PCB-187<br>PCB-182          |            | NotFnd           | <1.2           | 1.2          | U        |      | 50       |
| PCB-183                     |            | 25.83            | 15.1           | 1.2          | j        |      | 50       |
| PCB-185                     |            | NotFnd           | <1.2           | 1.2          | U        |      | 50       |
| PCB-174                     |            | 26.00            | 23.3           | 1.3          | M,J      |      | 50       |
| PCB-177<br>PCB-181          |            | 26.23<br>NotFnd  | 12.7<br><1.3   | 1.3<br>1.3   | J<br>U   |      | 50<br>50 |
| PCB-181<br>PCB-171/173      |            | 26.56            | < 6.3          | 1.4          |          | 6.3  | 50       |
| PCB-172                     |            | 27.36            | <4.2           | 1.4          |          | 4.2  | 50       |

## Sample Analysis Report

ENG-558-DFP-02 ALS Sample ID L2526958-6 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Split Ratio Sample E. Sabljic n/a --e-signature--01-Dec-2020

Run Information Run 1 Filename Run Date 5-201130B29 01-Dec-20 05:55 Final Volume 25 ul Dilution Factor Analysis Units pg

|                                | TEF          | Ret.           | Conc.        | EDL              |            | EMPC |          |
|--------------------------------|--------------|----------------|--------------|------------------|------------|------|----------|
| Target Analytes                | (WHO 2005)   | Time           | pg           | pg Fla           | gs         | pg   | LQL      |
| PCB-192                        |              | NotFnd         | <1.1         | 1.1              | U          |      | 50       |
| PCB-180/193                    |              | 27.68          | 45.4         | 1.1              | j          |      | 50       |
| PCB-180/193<br>PCB-191         |              | 27.85          | < 0.90       | 0.90             | U          |      | 50       |
| PCB-171                        |              | 28.37          | 17.3         | 1.0              | J          | 0.77 | 50       |
| PCB-170<br>PCB-190             |              | 28.64          | 3.09         | 0.66             | M,J        |      | 50       |
| PCB-199                        | 0.00003      | 29.95          | <1.2         | 0.48             |            | 1.2  | 50       |
|                                | 0.00003      |                |              |                  |            |      |          |
| PCB-202<br>PCB-201             |              | 26.26<br>26.73 | <2.7<br><1.8 | 0.59<br>0.58     | J,R<br>J,R |      | 50<br>50 |
|                                |              |                |              |                  |            | 1.8  |          |
| PCB-204                        |              | NotFnd         | < 0.58       | 0.58             | U          | 0.40 | 50       |
| PCB-197                        |              | 27.20          | < 0.57       | 0.57             |            | 0.43 | 50       |
| PCB-200                        |              | 27.29          | <1.3         | 0.59             |            | 1.3  | 50       |
| PCB-198/199                    |              | 28.69          | 8.94         | 0.56             | J          |      | 50       |
| PCB-196                        |              | 29.03          | <2.6         | 0.55             |            | 2.6  | 50       |
| PCB-203                        |              | 29.11          | 5.15         | 0.55             | J          |      | 50       |
| PCB-195                        |              | 29.83          | <3.2         | 0.59             |            | 3.2  | 50       |
| PCB-194                        |              | 31.05          | 9.71         | 0.62             | J          |      | 50       |
| PCB-205                        |              | 31.33          | < 0.76       | 0.54             |            | 0.76 | 50       |
| PCB-208                        |              | 29.68          | 5.19         | 1.5              | J          |      | 50       |
| PCB-207                        |              | 30.15          | <2.6         | 1.5              |            | 2.6  | 50       |
| PCB-206                        |              | 32.40          | 12.1         | 2.2              | J          |      | 50       |
| PCB-209                        |              | 33.53          | 103          | 4.1              | В          |      | 50       |
| Fortunation Chandenda          |              | <b>T</b> 1     | 0/ 0         |                  |            |      |          |
| Extraction Standards           | pg           | Time           | % Rec        | Limits           |            |      |          |
| 13C12-PCB-001                  | 2000         | 8.98           | 64           | 5-145            |            |      |          |
| 13C12-PCB-003                  | 2000         | 10.52          | 59           | 5-145            |            |      |          |
| 13C12-PCB-004                  | 2000         | 10.66          | 68           | 5-145            |            |      |          |
| 13C12-PCB-015                  | 2000         | 14.32          | 59           | 5-145            |            |      |          |
| 13C12-PCB-019                  | 2000         | 12.64          | 72           | 5-145            |            |      |          |
| 13C12-PCB-037                  | 2000         | 18.25          | 65           | 5-145            |            |      |          |
| 13C12-PCB-054                  | 2000         | 14.47          | 83           | 5-145            |            |      |          |
| 13C12-PCB-081                  | 2000         | 21.80          |              | 10-145           |            |      |          |
| 13C12-PCB-077                  | 2000         | 22.11          |              | 10-145           |            |      |          |
| 13C12-PCB-104                  | 2000         | 17.50          |              | 10-145           |            |      |          |
| 13C12-PCB-123                  | 2000         | 23.08          |              | 10-145           |            |      |          |
| 13C12-PCB-118                  | 2000         | 23.25          |              | 10-145           |            |      |          |
| 13C12-PCB-114                  | 2000         | 23.55          |              | 10-145           |            |      |          |
| 13C12-PCB-114                  | 2000         | 23.90          |              | 10-145           |            |      |          |
|                                |              | 25.50          |              |                  |            |      |          |
| 13C12-PCB-126                  | 2000         | 20.48          |              | 10-145           |            |      |          |
| 13C12-PCB-155<br>13C12-PCB-167 | 2000<br>2000 | 26.38          |              | 10-145<br>10-145 |            |      |          |
| 13C12-PCB-156/157              |              |                |              |                  |            |      |          |
|                                | 4000         | 27.01          |              | 10-145           |            |      |          |
| 13C12-PCB-169                  | 2000         | 28.67          |              | 10-145           |            |      |          |
| 13C12-PCB-188                  | 2000         | 23.48          |              | 10-145           |            |      |          |
| 13C12-PCB-189                  | 2000         | 29.93          |              | 10-145           |            |      |          |
| 13C12-PCB-202                  | 2000         | 26.25          |              | 10-145           |            |      |          |
| 13C12-PCB-205                  | 2000         | 31.31          |              | 10-145           |            |      |          |
| 13C12-PCB-208                  | 2000         | 29.67          |              | 10-145           |            |      |          |
| 13C12-PCB-206                  | 2000         | 32.39          |              | 10-145           |            |      |          |
| 13C12-PCB-209                  | 2000         | 33.50          | 45           | 10-145           |            |      |          |
| Cleanup Standards              |              |                |              |                  |            |      |          |
| 13C12-PCB-028                  | 2000         | 16.00          | 73           | 5-145            |            |      |          |
| 13C12-PCB-111                  | 2000         | 22.00          |              | 10-145           |            |      |          |
| 13C12-PCB-178                  | 2000         | 25.05          |              | 10-145           |            |      |          |
| 13012 100 170                  | 2000         | 25.05          | 22           | 10 143           |            |      |          |

#### **ALS Life Sciences Sample Analysis Report** ENG-558-DFP-02 Sampling Date ALS Sample ID L2526958-6 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Swab **Run Information** Run 1 Filename 5-201130B29 01-Dec-20 05:55 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 10.5 0.49 200 Total DiCB 400 825 0.92 Total TriCB 400 Total TetraCB Total PentaCB 525 588 0.30 800 0.48 800 Total HexaCB Total HeptaCB 172 0.48 400 Total OctaCB 36.2 0.54 400 Total NonaCB 19.9 1.5 200 DecaCB 103 4.1 200 Total PCB 3140 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00639 Mid Point PCB TEO 0.229 Upper Bound PCB TEQ 0.242 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

U

В

EMPC

## **Sample Analysis Report**

 Sample Name
 ENG-583-DFP-02

 ALS Sample ID
 L2526958-7

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011√30-30

 Run Date
 01-De-2√0-637

 Final Volume
 25
 ul

 Dilution Factor
 1
 val

 Analysis Units
 pg
 val

|                                | TEF               | Ret.             | Conc.         | EDL          |              | EMPC |          |
|--------------------------------|-------------------|------------------|---------------|--------------|--------------|------|----------|
| Target Analytes                | TEF<br>(WHO 2005) | Ret.<br>Time     | Conc.<br>pg   | PG F         |              | Pg   | LQL      |
|                                | 2000)             |                  |               |              |              |      |          |
| PCB-001                        |                   | 8.97             | <1.7          | 0.98         | M,J,R        | 1.7  | 50       |
| PCB-002<br>PCB-003             |                   | 10.40<br>10.51   | 5.95<br>5.25  | 0.75<br>0.56 | j<br>j       |      | 50<br>50 |
| PCB-003                        |                   | 10.51            | <3.9          | 1.9          | M,J,R        | 3.9  | 50       |
| PCB-010                        |                   | NotFnd           | <1.3          | 1.3          | U            |      | 50       |
| PCB-009                        |                   | NotFnd           | <1.3          | 1.3          | U            |      | 50       |
| PCB-007                        |                   | NotFnd           | <1.2          | 1.2          | U            |      | 50       |
| PCB-006                        |                   | 12.18            | 4.30          | 1.3          | J            |      | 50       |
| PCB-005                        |                   | 12.39            | <1.5          | 1.5          |              | 0.97 | 50       |
| PCB-008                        |                   | 12.44            | 15.8          | 1.2          | M,J,B        |      | 50       |
| PCB-014                        |                   | NotFnd           | <1.2          | 1.2          | U            |      | 50       |
| PCB-011<br>PCB-012/013         |                   | 13.95<br>14.11   | 1050<br><19   | 1.3<br>1.3   | M<br>M,J,R   | 19   | 50<br>50 |
| PCB-012/013<br>PCB-015         |                   | 14.11            | 17.0          | 1.5          | м,г,м<br>М,Ј | 13   | 50       |
| PCB-019                        |                   | 12.64            | 1.83          | 1.0          | J.,,,        |      | 50       |
| PCB-018/030                    |                   | 13.73            | 11.0          | 0.70         | J,B          |      | 50       |
| PCB-017                        |                   | 13.98            | 6.31          | 0.81         | j            |      | 50       |
| PCB-027                        |                   | 14.11            | < 0.70        | 0.61         | J,R          | 0.70 | 50       |
| PCB-024                        |                   | NotFnd           | < 0.61        | 0.61         | U            |      | 50       |
| PCB-016                        |                   | 14.28            | 6.08          | 0.98         | М,Ј          |      | 50       |
| PCB-032                        |                   | 14.55            | 3.83          | 0.57         | М,Ј          |      | 50       |
| PCB-034                        |                   | NotFnd           | < 0.76        | 0.76         | U            |      | 50       |
| PCB-023<br>PCB-026/029         |                   | NotFnd<br>15.52  | <0.72<br>4.16 | 0.72<br>0.72 | U            |      | 50<br>50 |
| PCB-025                        |                   | 15.52            | 4.16<br><2.1  | 0.72         |              | 2.1  | 50       |
| PCB-023                        |                   | 15.84            | 19.0          | 0.67         | J,B          |      | 50       |
| PCB-020/028                    |                   | 16.01            | 22.6          | 0.71         | J            |      | 50       |
| PCB-021/033                    |                   | 16.15            | <14           | 0.70         | J,R          | 14   | 50       |
| PCB-022                        |                   | 16.39            | 9.91          | 0.75         | J            |      | 50       |
| PCB-036                        |                   | 17.22            | <2.9          | 0.72         |              | 2.9  | 50       |
| PCB-039                        |                   | NotFnd           | < 0.73        | 0.73         | U            |      | 50       |
| PCB-038                        |                   | NotFnd           | < 0.79        | 0.79         | U            |      | 50       |
| PCB-035                        |                   | 18.03            | 23.3          | 0.82         | J            |      | 50       |
| PCB-037<br>PCB-054             |                   | 18.26<br>NotFnd  | 16.4<br><0.42 | 1.1<br>0.42  | J<br>U       |      | 50<br>50 |
| PCB-050/053                    |                   | 15.67            | 2.14          | 0.42         | J            |      | 50       |
| PCB-045/051                    |                   | 16.09            | 12.0          | 0.87         | J,B          |      | 50       |
| PCB-046                        |                   | 16.27            | 1.38          | 1.0          | J            |      | 50       |
| PCB-052                        |                   | 16.99            | 55.2          | 0.89         |              |      | 50       |
| PCB-073                        |                   | NotFnd           | <0.66         | 0.66         | U            |      | 50       |
| PCB-043                        |                   | 17.12            | <1.3          | 1.1          |              | 1.3  | 50       |
| PCB-049/069                    |                   | 17.26            | <15           | 0.80         | J,R          | 15   | 50       |
| PCB-048<br>PCB-044/047/065     |                   | 17.42<br>17.56   | 4.04<br>81.6  | 0.90<br>0.83 | J            |      | 50<br>50 |
| PCB-059/062/075                |                   | 17.74            | <1.6          | 0.68         | 1.R          | 1.6  | 50       |
| PCB-035/002/073                |                   | 17.86            | <5.4          | 1.0          | J,R          |      | 50       |
| PCB-040/041/071                |                   | 18.12            | 14.2          | 0.95         | 3,10         |      | 50       |
| PCB-064                        |                   | 18.24            | 13.6          | 0.69         | j            |      | 50       |
| PCB-072                        |                   | NotFnd           | < 0.91        | 0.91         | U            |      | 50       |
| PCB-068                        |                   | 18.80            | 7.74          | 0.86         | J            |      | 50       |
| PCB-057                        |                   | NotFnd           | <0.97         | 0.97         | U            |      | 50       |
| PCB-058                        |                   | NotFnd           | < 0.89        | 0.89         | U            |      | 50       |
| PCB-067                        |                   | NotFnd           | < 0.81        | 0.81         | U            |      | 50       |
| PCB-063<br>PCB-061/070/074/076 |                   | NotFnd<br>19.59  | <0.90<br>90.5 | 0.90<br>0.92 | U            |      | 50<br>50 |
| PCB-061/070/074/076<br>PCB-066 |                   | 19.59            | 31.4          | 0.92         | J            |      | 50       |
| PCB-055                        |                   | NotFnd           | < 0.99        | 0.99         | U            |      | 50       |
| PCB-056                        |                   | 20.15            | 23.0          | 1.0          | J            |      | 50       |
| PCB-060                        |                   | 20.27            | 11.1          | 0.98         | j            |      | 50       |
| PCB-080                        |                   | NotFnd           | < 0.85        | 0.85         | U            |      | 50       |
| PCB-079                        |                   | 21.30            | <1.7          | 0.90         |              | 1.7  | 50       |
| PCB-078                        |                   | NotFnd           | <1.1          | 1.1          | U            |      | 50       |
| PCB-081                        | 0.0003            | NotFnd           | <1.1          | 1.1          | U            |      | 50       |
| PCB-077                        | 0.0001            | 22.13            | 16.1          | 1.2          | J            |      | 50       |
| PCB-104                        |                   | NotFnd           | < 0.73        | 0.73         | U            |      | 50       |
| PCB-096<br>PCB-103             |                   | NotFnd<br>NotFnd | < 0.71        | 0.71         | U            |      | 50<br>50 |
| PCB-103<br>PCB-094             |                   | NotFnd           | <1.6<br><1.9  | 1.6<br>1.9   | U<br>U       |      | 50<br>50 |
| PCB-094<br>PCB-095             |                   | 19.13            | <1.9<br>85.7  | 1.7          | U            |      | 50       |
|                                |                   | 25.25            | 00.7          | 2            |              |      | 50       |

## **Sample Analysis Report**

 Sample Name
 ENG-583-DFP-02

 ALS Sample ID
 L2526958-7

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011 J S I

 Run Date
 01-De-2 J S 37

 Final Volume
 25 ul

 Dilution Factor
 1

 Analysis Units
 pg 

|                                                        | TEF        | Ret.             | Conc.        | EDL        |             | EMPC  |          |
|--------------------------------------------------------|------------|------------------|--------------|------------|-------------|-------|----------|
| Target Analytes                                        | (WHO 2005) | Time             | conc.<br>pg  | pg F       | lags        | Pg    | LQL      |
|                                                        |            |                  |              |            |             |       |          |
| PCB-088/091<br>PCB-084                                 |            | 19.58<br>19.74   | 15.9<br>33.4 | 1.8<br>2.1 |             |       | 50<br>50 |
| PCB-089                                                |            | 19.74            | <2.1         | 2.1        | ·           |       | 50       |
| PCB-121                                                |            | NotFnd           | <1.4         | 1.4        | L           |       | 50       |
| PCB-092                                                |            | 20.33            | 24.9         | 2.0        |             |       | 50       |
| PCB-090/101/113                                        |            | 20.63            | 144          | 1.6        |             |       | 50       |
| PCB-083/099                                            |            | 20.95            | 107          | 2.0        |             |       | 50       |
| PCB-112<br>PCB-086/087/097/109/119/125                 |            | 21.06<br>21.30   | <17<br>119   | 1.4<br>1.7 | J,F<br>M    |       | 50<br>50 |
| PCB-086/087/097/109/119/125<br>PCB-085/110/115/116/117 |            | 21.30            | 266          | 1.6        | N<br>N      |       | 50<br>50 |
| PCB-083/110/113/110/117                                |            | 21.92            | <24          | 2.6        | и,<br>М,Ј,F |       | 50       |
| PCB-111                                                |            | NotFnd           | <1.5         | 1.5        | ,s,.        |       | 50       |
| PCB-120                                                |            | NotFnd           | <1.5         | 1.5        | L           | J     | 50       |
| PCB-108/124                                            |            | 22.89            | 7.13         | 2.1        |             |       | 50       |
| PCB-107                                                |            | 23.03            | 9.48         | 1.8        | Μ,          |       | 50       |
| PCB-123                                                | 0.00003    | 23.07            | <2.8         | 2.3        |             | 2.8   | 50       |
| PCB-106                                                | 0.00003    | NotFnd           | <2.2         | 2.2        | L           | J     | 50       |
| PCB-118<br>PCB-122                                     | 0.00003    | 23.26<br>NotFnd  | 165<br><2.3  | 2.2<br>2.3 | L           |       | 50<br>50 |
| PCB-114                                                | 0.00003    | 23.55            | <3.2         | 2.1        |             | 3.2   | 50       |
| PCB-105                                                | 0.00003    | 23.91            | 63.0         | 2.2        | -,.         |       | 50       |
| PCB-127                                                |            | NotFnd           | <2.3         | 2.3        | L           | J     | 50       |
| PCB-126                                                | 0.1        | 25.51            | <2.7         | 2.7        | L           | J 2.2 | 50       |
| PCB-155                                                |            | NotFnd           | < 0.54       | 0.54       | L           |       | 50       |
| PCB-152                                                |            | NotFnd           | <0.38        | 0.38       | L           |       | 50       |
| PCB-150<br>PCB-136                                     |            | NotFnd           | < 0.36       | 0.36       | 1.0         |       | 50       |
| PCB-136<br>PCB-145                                     |            | 20.96<br>NotFnd  | <17<br><0.39 | 0.39       | J,F         |       | 50<br>50 |
| PCB-145<br>PCB-148                                     |            | NotFnd           | <0.55        | 0.55       | Ĺ           |       | 50       |
| PCB-135/151                                            |            | 22.16            | 45.2         | 0.59       | М,          |       | 50       |
| PCB-154                                                |            | 22.27            | <0.72        | 0.46       |             | 0.72  | 50       |
| PCB-144                                                |            | 22.46            | <6.6         | 0.60       |             | 6.6   | 50       |
| PCB-147/149                                            |            | 22.64            | 158          | 1.3        |             |       | 50       |
| PCB-134/143                                            |            | 22.79            | <10          | 1.5        | J,F         |       | 50       |
| PCB-139/140                                            |            | 22.96            | 4.13         | 1.3        |             |       | 50       |
| PCB-131<br>PCB-142                                     |            | 23.10<br>NotFnd  | <2.9<br><1.5 | 1.6<br>1.5 | J,F         | 2.9   | 50<br>50 |
| PCB-142<br>PCB-132                                     |            | 23.35            | 76.9         | 1.5        |             | ,     | 50       |
| PCB-132                                                |            | 23.51            | <1.9         | 1.5        | J.F         | 1.9   | 50       |
| PCB-165                                                |            | NotFnd           | <1.1         | 1.1        | ٠,٠         |       | 50       |
| PCB-146                                                |            | 23.85            | 21.9         | 1.3        | -           | I     | 50       |
| PCB-161                                                |            | NotFnd           | <1.1         | 1.1        | L           | J     | 50       |
| PCB-153/168                                            |            | 24.18            | 135          | 1.1        |             | _     | 50       |
| PCB-141                                                |            | 24.31            | 40.0         | 1.5        |             |       | 50       |
| PCB-130<br>PCB-137/164                                 |            | 24.53<br>24.71   | <14<br>26.8  | 1.8<br>1.3 | J,F<br>M,:  |       | 50<br>50 |
| PCB-13//164<br>PCB-129/138/163                         |            | 24.71<br>24.87   | 26.8         | 1.5        | ۱۳۱,.       | ,     | 50       |
| PCB-129/138/103                                        |            | NotFnd           | <1.2         | 1.2        | L           | J     | 50       |
| PCB-158                                                |            | 25.07            | 22.0         | 0.96       |             |       | 50       |
| PCB-128/166                                            |            | 25.57            | 33.8         | 1.3        |             |       | 50       |
| PCB-159                                                |            | 26.00            | 1.40         | 1.1        |             |       | 50       |
| PCB-162                                                |            | NotFnd           | <1.2         | 1.2        | L.          |       | 50       |
| PCB-167                                                | 0.00003    | 26.39            | <7.5         | 0.92       | J,F         |       | 50       |
| PCB-156/157                                            | 0.00003    | 27.02            | 17.0         | 1.3        |             |       | 100      |
| PCB-169<br>PCB-188                                     | 0.03       | NotFnd<br>NotFnd | <1.0<br><1.2 | 1.0<br>1.2 | L           |       | 50<br>50 |
| PCB-188<br>PCB-179                                     |            | 23.72            | <1.2<br><9.1 | 1.1        | J,F         |       | 50       |
| PCB-184                                                |            | 23.94            | < 0.94       | 0.94       |             | 0.55  | 50       |
| PCB-176                                                |            | 24.16            | 3.93         | 1.1        |             | 1     | 50       |
| PCB-186                                                |            | NotFnd           | <1.1         | 1.1        | ι           | J     | 50       |
| PCB-178                                                |            | 25.06            | <6.6         | 1.6        |             | 6.6   | 50       |
| PCB-175                                                |            | 25.39            | <1.6         | 1.6        |             | 1.2   | 50       |
| PCB-187                                                |            | 25.52            | 38.8         | 1.4        | -           |       | 50       |
| PCB-182                                                |            | NotFnd           | <1.5         | 1.5        | L           |       | 50       |
| PCB-183                                                |            | 25.83            | 16.9         | 1.5        | -           |       | 50       |
| PCB-185                                                |            | 25.92            | 2.86         | 1.5        | -           |       | 50<br>50 |
| PCB-174<br>PCB-177                                     |            | 26.00<br>26.23   | 29.2<br><13  | 1.6<br>1.7 | 1.6         | 13    | 50<br>50 |
| PCB-177<br>PCB-181                                     |            | NotFnd           | <1.6         | 1.6        | J,۲۰<br>ا   |       | 50       |
| PCB-171/173                                            |            | 26.56            | <8.5         | 1.8        |             | 8.5   | 50       |
| PCB-172                                                |            | 27.33            | 9.11         | 1.8        | -7:         |       | 50       |

## Sample Analysis Report

ENG-583-DFP-02 ALS Sample ID L2526958-7 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Sample Size Percent Moisture n/a Split Ratio

Sample

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information Run 1 Filename Run Date

5-201130B30 01-Dec-20 06:37 Final Volume 25 ul Dilution Factor Analysis Units pg

|                                | TEF        | Ret.   | Conc.    | EDL    |       | EMPC  |     |
|--------------------------------|------------|--------|----------|--------|-------|-------|-----|
| Target Analytes                | (WHO 2005) | Time   | pg       | pg I   | Flags | pg    | LQL |
| PCB-192                        |            | NotFnd | <1.4     | 1.4    |       | J     | 50  |
| PCB-192<br>PCB-180/193         |            | 27.68  | 64.8     | 1.4    | ,     | -     | 50  |
|                                |            |        |          |        | , ,   | , ,,  |     |
| PCB-191                        |            | 27.85  | <2.3     | 1.2    | 3,1   |       | 50  |
| PCB-170                        |            | 28.37  | 20.5     | 1.3    |       | J     | 50  |
| PCB-190                        |            | 28.65  | <3.1     | 0.84   |       | 3.1   | 50  |
| PCB-189                        | 0.00003    | NotFnd | <0.60    | 0.60   |       |       | 50  |
| PCB-202                        |            | 26.27  | <7.4     | 1.1    | J,I   |       | 50  |
| PCB-201                        |            | 26.73  | <2.8     | 0.88   | ا, ا  |       | 50  |
| PCB-204                        |            | NotFnd | < 0.87   | 0.87   | ı     |       | 50  |
| PCB-197                        |            | NotFnd | <0.85    | 0.85   |       | J     | 50  |
| PCB-200                        |            | 27.29  | <1.7     | 0.89   | M,J,I | R 1.7 | 50  |
| PCB-198/199                    |            | 28.67  | 14.8     | 0.85   |       | J     | 50  |
| PCB-196                        |            | 29.03  | <4.3     | 0.83   | ١,١   | R 4.3 | 50  |
| PCB-203                        |            | 29.12  | 10.1     | 0.82   |       | J     | 50  |
| PCB-195                        |            | 29.85  | 3.17     | 0.96   |       | J     | 50  |
| PCB-194                        |            | 31.06  | 14.0     | 1.0    |       | j     | 50  |
| PCB-205                        |            | NotFnd | < 0.76   | 0.76   |       | J     | 50  |
| PCB-208                        |            | 29.68  | 9.77     | 2.8    |       | J     | 50  |
| PCB-207                        |            | 30.15  | <5.0     | 2.4    | 3,1   |       | 50  |
| PCB-206                        |            | 32.40  | 16.6     | 2.4    | М,    |       | 50  |
| PCB-209                        |            | 33.53  | 141      | 7.2    |       | В     | 50  |
| FCB-209                        |            | 33.33  | 141      | 1.2    |       | -     | 30  |
| Extraction Standards           | pg         | Time   | % Rec    | Limits |       |       |     |
| Extraction Standards           | PB         |        | ,,,,,,,, |        |       |       |     |
| 13C12-PCB-001                  | 2000       | 8.95   | 57       | 5-145  |       |       |     |
| 13C12-PCB-003                  | 2000       | 10.49  | 59       | 5-145  |       |       |     |
| 13C12-PCB-004                  | 2000       | 10.65  | 65       | 5-145  |       |       |     |
| 13C12-PCB-015                  | 2000       | 14.32  | 55       | 5-145  |       |       |     |
| 13C12-PCB-019                  | 2000       | 12.62  | 69       | 5-145  |       |       |     |
| 13C12-PCB-019                  | 2000       |        |          |        |       |       |     |
|                                |            | 18.25  | 62       | 5-145  |       |       |     |
| 13C12-PCB-054                  | 2000       | 14.47  | 77       |        |       |       |     |
| 13C12-PCB-081                  | 2000       | 21.81  |          | 10-145 |       |       |     |
| 13C12-PCB-077                  | 2000       | 22.11  |          | 10-145 |       |       |     |
| 13C12-PCB-104                  | 2000       | 17.50  |          | 10-145 |       |       |     |
| 13C12-PCB-123                  | 2000       | 23.08  |          | 10-145 |       |       |     |
| 13C12-PCB-118                  | 2000       | 23.25  |          | 10-145 |       |       |     |
| 13C12-PCB-114                  | 2000       | 23.55  |          | 10-145 |       |       |     |
| 13C12-PCB-105                  | 2000       | 23.90  | 69       | 10-145 |       |       |     |
| 13C12-PCB-126                  | 2000       | 25.51  | 65       | 10-145 |       |       |     |
| 13C12-PCB-155                  | 2000       | 20.48  | 38       | 10-145 |       |       |     |
| 13C12-PCB-167                  | 2000       | 26.38  |          | 10-145 |       |       |     |
| 13C12-PCB-156/157              | 4000       | 27.02  |          | 10-145 |       |       |     |
| 13C12-PCB-169                  | 2000       | 28.67  |          | 10-145 |       |       |     |
| 13C12-PCB-188                  | 2000       | 23.48  |          | 10-145 |       |       |     |
| 13C12-PCB-189                  | 2000       | 29.93  |          | 10-145 |       |       |     |
| 13C12-PCB-202                  | 2000       | 26.25  |          | 10-145 |       |       |     |
| 13C12-PCB-202                  | 2000       | 31.31  |          | 10-145 |       |       |     |
|                                |            |        |          |        |       |       |     |
| 13C12-PCB-208                  | 2000       | 29.67  |          | 10-145 |       |       |     |
| 13C12-PCB-206                  | 2000       | 32.39  |          | 10-145 |       |       |     |
| 13C12-PCB-209                  | 2000       | 33.50  | 25       | 10-145 |       |       |     |
| Cleanup Standards              |            |        |          |        |       |       |     |
| 13C12-PCB-028                  | 2000       | 16.00  | 67       | 5-145  |       |       |     |
| 13C12-PCB-028<br>13C12-PCB-111 | 2000       | 22.00  |          | 10-145 |       |       |     |
| 13C12-PCB-111<br>13C12-PCB-178 | 2000       | 25.05  |          | 10-145 |       |       |     |
|                                | 2000       | 25.05  | /4       | 10-145 |       |       |     |

#### **ALS Life Sciences Sample Analysis Report** ENG-583-DFP-02 Sampling Date ALS Sample ID L2526958-7 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Swab **Run Information** Run 1 Filename 5-201130B30 01-Dec-20 06:37 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 12.9 0.56 200 Total DiCB 400 1110 1.2 Total TriCB 0.57 400 Total TetraCB Total PentaCB 389 0.42 800 1090 0.71 800 Total HexaCB Total HeptaCB 229 0.60 400 Total OctaCB 58.3 400 0.76 Total NonaCB 31.4 200 2.4 DecaCB 141 7.2 200 Total PCB 4080 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00896 Mid Point PCB TEO 0.160 Upper Bound PCB TEQ 0.310 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated.

U

В

EMPC

Indicates that this compound was not detected above the EDL.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

## Sample Analysis Report

ENG-168-DFP-01 ALS Sample ID L2526958-8 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Split Ratio E. Sabljic --e-signature--01-Dec-2020 Sample n/a

Run Information Run 1 Filename Run Date 5-201130B31 01-Dec-20 07:19 Final Volume 25 ul Dilution Factor Analysis Units pg

| 1                          | TEF                                     | Ret.            | Conc.         | EDL          |            | EMPC       |          |
|----------------------------|-----------------------------------------|-----------------|---------------|--------------|------------|------------|----------|
| Target Analytes            | TEF<br>(WHO 2005)                       | Ret.<br>Time    | Conc.<br>pg   |              | lags       | Pg         | LQL      |
|                            | (************************************** |                 |               |              |            | PA         |          |
| PCB-001                    |                                         | NotFnd          | <1.4          | 1.4          | U          | 2.0        | 50       |
| PCB-002                    |                                         | 10.42           | < 2.8         | 0.84         | J,R        | 2.8        | 50       |
| PCB-003<br>PCB-004         |                                         | 10.54<br>10.69  | 4.40<br><3.7  | 0.57<br>1.7  | J<br>M 1 R | 3 7        | 50<br>50 |
| PCB-004<br>PCB-010         |                                         | 10.69<br>NotFnd | <3.7<br><1.1  | 1.7          | M,J,R<br>U | 3.7        | 50<br>50 |
| PCB-010                    |                                         | NotFnd          | <1.1          | 1.1          | U          |            | 50       |
| PCB-007                    |                                         | 12.04           | 4.09          | 1.1          | j          |            | 50       |
| PCB-006                    |                                         | 12.19           | <2.9          | 1.2          | M,J,R      | 2.9        | 50       |
| PCB-005                    |                                         | 12.39           | <1.3          | 1.3          | M,U        |            | 50       |
| PCB-008                    |                                         | 12.46           | 13.1          | 1.1          | м,ј,в      |            | 50       |
| PCB-014                    |                                         | NotFnd          | <1.7          | 1.7          | U          |            | 50       |
| PCB-011                    |                                         | 13.97           | 136           | 1.7          | М          |            | 50       |
| PCB-012/013                |                                         | 14.13           | 5.62          | 1.8          | M,J        | 12         | 50<br>50 |
| PCB-015<br>PCB-019         |                                         | 14.34<br>NotFnd | <13<br><0.87  | 2.1<br>0.87  | J,R<br>U   | 13         | 50       |
| PCB-018/030                |                                         | 13.75           | 12.1          | 0.83         | J,B        |            | 50       |
| PCB-017                    |                                         | 13.99           | 5.92          | 0.97         | J,5        |            | 50       |
| PCB-027                    |                                         | 14.12           | < 0.74        | 0.72         |            | 0.74       | 50       |
| PCB-024                    |                                         | NotFnd          | < 0.72        | 0.72         | U          |            | 50       |
| PCB-016                    |                                         | 14.29           | 6.81          | 1.2          | J          |            | 50       |
| PCB-032                    |                                         | 14.57           | 4.45          | 0.68         | J          |            | 50       |
| PCB-034                    |                                         | NotFnd          | <1.1          | 1.1          | U          |            | 50       |
| PCB-023                    |                                         | NotFnd          | <1.0          | 1.0          | U          | 2.5        | 50       |
| PCB-026/029<br>PCB-025     |                                         | 15.54           | <3.6<br><2.1  | 1.0          |            | 3.6<br>2.1 | 50<br>50 |
| PCB-025<br>PCB-031         |                                         | 15.66<br>15.85  | <2.1<br>21.5  | 0.90<br>0.94 | J,R<br>J,B | 2.1        | 50       |
| PCB-020/028                |                                         | 16.03           | 26.5          | 0.99         | J,B        |            | 50       |
| PCB-021/033                |                                         | 16.16           | 18.1          | 0.98         | j          |            | 50       |
| PCB-022                    |                                         | 16.40           | 10.8          | 1.0          | j          |            | 50       |
| PCB-036                    |                                         | 17.25           | <1.0          | 1.0          | U          | 0.70       | 50       |
| PCB-039                    |                                         | NotFnd          | <1.0          | 1.0          | U          |            | 50       |
| PCB-038                    |                                         | NotFnd          | <1.1          | 1.1          | U          |            | 50       |
| PCB-035                    |                                         | 18.06           | <3.8          | 1.2          |            | 3.8        | 50       |
| PCB-037                    |                                         | 18.27           | 17.0          | 1.4          | J          |            | 50       |
| PCB-054<br>PCB-050/053     |                                         | NotFnd<br>15.69 | <0.48<br><2.5 | 0.48<br>0.71 | U<br>1 P   | 2.5        | 50<br>50 |
| PCB-045/051                |                                         | 16.10           | <2.5<br>10.3  | 0.71         | J,R<br>J,B | 2.3        | 50       |
| PCB-043/031                |                                         | 16.27           | < 0.85        | 0.85         | U          | 0.73       | 50       |
| PCB-052                    |                                         | 17.00           | 110           | 0.76         | -          |            | 50       |
| PCB-073                    |                                         | NotFnd          | < 0.56        | 0.56         | U          |            | 50       |
| PCB-043                    |                                         | NotFnd          | < 0.97        | 0.97         | U          |            | 50       |
| PCB-049/069                |                                         | 17.27           | 27.1          | 0.68         | J          |            | 50       |
| PCB-048                    |                                         | 17.42           | <5.4          | 0.77         | J,R        | 5.4        | 50       |
| PCB-044/047/065            |                                         | 17.57           | 95.7          | 0.71         |            | 2.5        | 50       |
| PCB-059/062/075            |                                         | 17.75           | < 2.0         | 0.58         |            | 2.0        | 50       |
| PCB-042<br>PCB-040/041/071 |                                         | 17.86<br>18.13  | 9.36<br>19.6  | 0.88<br>0.81 | ز<br>د,M   |            | 50<br>50 |
| PCB-040/041/071<br>PCB-064 |                                         | 18.25           | 22.6          | 0.59         | ر,۱۳۱<br>ز |            | 50       |
| PCB-072                    |                                         | NotFnd          | <0.99         | 0.99         | U          |            | 50       |
| PCB-068                    |                                         | 18.81           | <5.1          | 0.93         |            | 5.1        | 50       |
| PCB-057                    |                                         | NotFnd          | <1.1          | 1.1          | Ú          |            | 50       |
| PCB-058                    |                                         | NotFnd          | < 0.97        | 0.97         | U          |            | 50       |
| PCB-067                    |                                         | NotFnd          | <0.89         | 0.89         | U          |            | 50       |
| PCB-063                    |                                         | NotFnd          | <0.98         | 0.98         | U          |            | 50       |
| PCB-061/070/074/076        |                                         | 19.60           | 150           | 1.0          |            |            | 50       |
| PCB-066                    |                                         | 19.78           | 49.2          | 1.0          | J          |            | 50       |
| PCB-055<br>PCB-056         |                                         | NotFnd<br>20.16 | <1.1<br><19   | 1.1          | U<br>1 P   | 19         | 50<br>50 |
| PCB-056<br>PCB-060         |                                         | 20.16           | <19<br>13.0   | 1.1          | J,K<br>1   | 13         | 50<br>50 |
| PCB-080                    |                                         | NotFnd          | < 0.93        | 0.93         | U          |            | 50       |
| PCB-079                    |                                         | 21.25           | <2.6          | 0.99         | M,J,R      | 2.6        | 50       |
| PCB-078                    |                                         | NotFnd          | <1.2          | 1.2          | U          |            | 50       |
| PCB-081                    | 0.0003                                  | NotFnd          | <1.3          | 1.3          | U          |            | 50       |
| PCB-077                    | 0.0001                                  | 22.13           | <9.5          | 1.3          |            | 9.5        | 50       |
| PCB-104                    |                                         | NotFnd          | < 0.69        | 0.69         | U          |            | 50       |
| PCB-096                    |                                         | 17.76           | <1.2          | 0.64         | M,J,R      | 1.2        | 50       |
| PCB-103                    |                                         | NotFnd          | <1.5          | 1.5          | U          |            | 50       |
| PCB-094                    |                                         | NotFnd          | <1.8          | 1.8          | U          |            | 50       |
| PCB-095                    |                                         | 19.13           | 172           | 1.6          |            |            | 50       |
| PCB-093/098/100/102        |                                         | 19.31           | 6.68          | 1.7          | J          |            | 50       |

## Sample Analysis Report

 Sample Name
 ENG-168-DFP-01

 ALS Sample ID
 L2526958-8

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run 1

 Filename
 5-201130B31

 Run Date
 01-Dec-20 07:19

 Final Volume
 25 ul

 Dilution Factor
 1

 Analysis Units
 pg

|                             | TEF        | Ret.             | Conc.          | EDL          |              | ЕМРС |          |
|-----------------------------|------------|------------------|----------------|--------------|--------------|------|----------|
| Target Analytes             | (WHO 2005) | Time             | pg             |              | lags         | pg   | LQL      |
| PCB-088/091                 |            | 19.60            | 26.4           | 1.7          | 3            |      | 50       |
| PCB-088/091<br>PCB-084      |            | 19.60            | 62.6           | 2.0          | ,            |      | 50       |
| PCB-089                     |            | 19.99            | <2.0           | 2.0          | U            | 1.6  | 50       |
| PCB-121                     |            | NotFnd           | <1.3           | 1.3          | Ü            |      | 50       |
| PCB-092                     |            | 20.34            | 43.1           | 1.9          | J            |      | 50       |
| PCB-090/101/113             |            | 20.64            | 242            | 1.6          |              |      | 50       |
| PCB-083/099                 |            | 20.96            | 117            | 1.9          |              |      | 50       |
| PCB-112                     |            | NotFnd           | <1.4           | 1.4          | U            |      | 50       |
| PCB-086/087/097/109/119/125 |            | 21.31            | 172            | 1.6          | М            |      | 50       |
| PCB-085/110/115/116/117     |            | 21.72            | 328            | 1.5          | М            |      | 50       |
| PCB-082                     |            | 21.92            | 28.3           | 2.5          | J            |      | 50       |
| PCB-111                     |            | NotFnd           | <1.4           | 1.4          | U            |      | 50       |
| PCB-120                     |            | NotFnd<br>22.90  | <1.4<br><8.1   | 1.4<br>1.9   | U            |      | 50<br>50 |
| PCB-108/124<br>PCB-107      |            | 23.03            | <9.9           | 1.6          | J,R<br>M,J,R |      | 50       |
| PCB-123                     | 0.00003    | 23.08            | 2.61           | 2.1          | M,J          | 3.3  | 50       |
| PCB-106                     | 0.00003    | NotFnd           | <2.0           | 2.0          | U            |      | 50       |
| PCB-118                     | 0.00003    | 23.26            | 196            | 2.0          |              |      | 50       |
| PCB-122                     |            | NotFnd           | <2.1           | 2.1          | U            |      | 50       |
| PCB-114                     | 0.00003    | 23.56            | 5.73           | 1.9          | J            |      | 50       |
| PCB-105                     | 0.00003    | 23.93            | 68.7           | 2.1          |              |      | 50       |
| PCB-127                     |            | NotFnd           | <2.1           | 2.1          | U            |      | 50       |
| PCB-126                     | 0.1        | 25.51            | <2.6           | 2.6          | M,U          |      | 50       |
| PCB-155                     |            | NotFnd           | < 0.72         | 0.72         | U            |      | 50       |
| PCB-152                     |            | NotFnd           | <0.45          | 0.45         | U            |      | 50       |
| PCB-150                     |            | NotFnd           | < 0.43         | 0.43         | U            |      | 50       |
| PCB-136                     |            | 20.97            | 30.5           | 0.46         | J            |      | 50       |
| PCB-145<br>PCB-148          |            | NotFnd<br>NotFnd | <0.47<br><0.66 | 0.47<br>0.66 | U            |      | 50<br>50 |
| PCB-135/151                 |            | 22.18            | 61.0           | 0.70         | М            |      | 50       |
| PCB-154                     |            | NotFnd           | < 0.54         | 0.54         | U            |      | 50       |
| PCB-144                     |            | 22.47            | 10.5           | 0.71         | j            |      | 50       |
| PCB-147/149                 |            | 22.66            | 190            | 1.0          |              |      | 50       |
| PCB-134/143                 |            | 22.79            | <12            | 1.3          | J,R          | 12   | 50       |
| PCB-139/140                 |            | 22.97            | <5.3           | 1.0          | J,R          | 5.3  | 50       |
| PCB-131                     |            | 23.10            | <4.3           | 1.3          | J,R          | 4.3  | 50       |
| PCB-142                     |            | NotFnd           | <1.3           | 1.3          | U            |      | 50       |
| PCB-132                     |            | 23.36            | 84.6           | 1.3          |              |      | 50       |
| PCB-133                     |            | 23.54            | <1.9           | 1.2          |              | 1.9  | 50       |
| PCB-165                     |            | NotFnd           | < 0.93         | 0.93         | U            |      | 50       |
| PCB-146                     |            | 23.87            | 22.0           | 1.1          |              |      | 50       |
| PCB-161                     |            | NotFnd           | < 0.89         | 0.89         | U            |      | 50       |
| PCB-153/168<br>PCB-141      |            | 24.18<br>24.31   | 134<br>38.5    | 0.93<br>1.2  | J            |      | 50<br>50 |
| PCB-141                     |            | 24.51            | 15.6           | 1.5          | J            |      | 50       |
| PCB-137/164                 |            | 24.71            | 26.3           | 1.1          | м,3          |      | 50       |
| PCB-129/138/163             |            | 24.87            | 208            | 1.2          | ,-           |      | 50       |
| PCB-160                     |            | NotFnd           | < 0.98         | 0.98         | U            |      | 50       |
| PCB-158                     |            | 25.07            | 21.1           | 0.79         | J            |      | 50       |
| PCB-128/166                 |            | 25.57            | 27.1           | 1.1          | J            |      | 50       |
| PCB-159                     |            | 26.00            | <1.0           | 0.94         | J,R          |      | 50       |
| PCB-162                     |            | NotFnd           | < 0.98         | 0.98         | U            |      | 50       |
| PCB-167                     | 0.00003    | 26.40            | <4.2           | 0.77         | J,R          |      | 50       |
| PCB-156/157                 | 0.00003    | 27.02            | 14.3           | 1.0          | J,B          |      | 100      |
| PCB-169                     | 0.03       | NotFnd           | < 0.84         | 0.84         | U            |      | 50       |
| PCB-188<br>PCB-179          |            | NotFnd           | < 0.93         | 0.93         | U            |      | 50       |
| PCB-179<br>PCB-184          |            | 23.71<br>23.94   | 14.2<br><0.66  | 0.74<br>0.66 | J            | 0.60 | 50<br>50 |
| PCB-176                     |            | 24.16            | 3.72           | 0.75         |              | 0.60 | 50       |
| PCB-186                     |            | NotFnd           | < 0.77         | 0.77         | U            |      | 50       |
| PCB-178                     |            | 25.06            | <4.8           | 1.1          |              | 4.8  | 50       |
| PCB-175                     |            | NotFnd           | <1.1           | 1.1          | U            |      | 50       |
| PCB-187                     |            | 25.53            | 36.2           | 0.96         | j            |      | 50       |
| PCB-182                     |            | NotFnd           | <1.1           | 1.1          | U            |      | 50       |
| PCB-183                     |            | 25.85            | 13.5           | 1.1          | j            |      | 50       |
| PCB-185                     |            | 25.93            | <1.6           | 1.1          |              | 1.6  | 50       |
| PCB-174                     |            | 26.02            | <23            | 1.1          | M,J,R        |      | 50       |
| PCB-177                     |            | 26.23            | 14.7           | 1.2          | J            |      | 50       |
| PCB-181                     |            | NotFnd           | <1.1           | 1.1          | U            |      | 50       |
| PCB-171/173                 |            | 26.56            | 9.55           | 1.2          | J            |      | 50       |
| PCB-172                     |            | 27.33            | <2.9           | 1.2          | J,R          | 2.9  | 50       |

## Sample Analysis Report

 Sample Name
 ENG-168-DFP-01

 ALS Sample ID
 L2526958-8

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1 Sample
Percent Moisture n/a
Split Ratio 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 $\begin{array}{c|cccc} Run \ Information & Run \ 1 \\ \hline Filename & 5-201130B31 \\ Run \ Date & 01-be->07:19 \\ Final \ Volume & 25 & ul \end{array}$ 

Dilution Factor 1
Analysis Units pg

|                      | TEF        | Ret.   | Conc.  | EDL    |      | EMPC |     |
|----------------------|------------|--------|--------|--------|------|------|-----|
| Target Analytes      | (WHO 2005) | Time   | pg     | pg Fl  | ags  | pg   | LQL |
| PCB-192              |            | NotFnd | < 0.95 | 0.95   | U    |      | 50  |
| PCB-180/193          |            | 27.68  | 53.6   | 0.94   | ·    |      | 50  |
| PCB-191              |            | 27.88  | <1.4   | 0.81   | 1.R  | 1.4  | 50  |
| PCB-170              |            | 28.37  | 17.9   | 0.94   | 3,10 |      | 50  |
| PCB-190              |            | 28.64  | 2.96   | 0.59   | м,ј  |      | 50  |
| PCB-189              | 0.00003    | 29.96  | < 0.69 | 0.69   |      | 0.59 | 50  |
| PCB-202              |            | 26.27  | 9.47   | 1.3    | J.,5 |      | 50  |
| PCB-201              |            | 26.75  | 2.62   | 0.91   | j    |      | 50  |
| PCB-201              |            | NotFnd | < 0.90 | 0.90   | U    |      | 50  |
| PCB-197              |            | NotFnd | <0.88  | 0.88   | U    |      | 50  |
| PCB-200              |            | 27.31  | <2.6   | 0.92   | J,R  | 2.6  | 50  |
| PCB-198/199          |            | 28.69  | 12.9   | 0.88   | 3,10 | 2.0  | 50  |
| PCB-196              |            | 29.03  | <4.0   | 0.87   | J,R  | 4.0  | 50  |
| PCB-203              |            | 29.12  | <7.2   | 0.86   | J,R  |      | 50  |
| PCB-195              |            | 29.86  | 3.21   | 1.2    | 3,10 | 7.2  | 50  |
| PCB-194              |            | 31.06  | 12.2   | 1.2    | j    |      | 50  |
| PCB-205              |            | NotFnd | < 0.84 | 0.84   | Ú    |      | 50  |
| PCB-208              |            | 29.68  | 7.88   | 2.8    | j    |      | 50  |
| PCB-207              |            | 30.15  | <2.7   | 2.1    | J,R  | 2.7  | 50  |
| PCB-206              |            | 32.40  | <10    | 2.2    | J,R  | 10   | 50  |
| PCB-209              |            | 33.53  | 133    | 8.7    | B    | 10   | 50  |
| 1 65 203             |            | 33.33  | 133    | 0.7    |      |      | 50  |
| Extraction Standards | pg         | Time   | % Rec  | Limits |      |      |     |
|                      |            |        |        |        |      |      |     |
| 13C12-PCB-001        | 2000       | 8.95   | 74     | 5-145  |      |      |     |
| 13C12-PCB-003        | 2000       | 10.54  | 71     | 5-145  |      |      |     |
| 13C12-PCB-004        | 2000       | 10.68  | 79     | 5-145  |      |      |     |
| 13C12-PCB-015        | 2000       | 14.33  | 64     | 5-145  |      |      |     |
| 13C12-PCB-019        | 2000       | 12.64  | 80     | 5-145  |      |      |     |
| 13C12-PCB-037        | 2000       | 18.26  | 72     | 5-145  |      |      |     |
| 13C12-PCB-054        | 2000       | 14.48  | 89     | 5-145  |      |      |     |
| 13C12-PCB-081        | 2000       | 21.82  | 83     | 10-145 |      |      |     |
| 13C12-PCB-077        | 2000       | 22.12  |        | 10-145 |      |      |     |
| 13C12-PCB-104        | 2000       | 17.51  | 100    | 10-145 |      |      |     |
| 13C12-PCB-123        | 2000       | 23.08  |        | 10-145 |      |      |     |
| 13C12-PCB-118        | 2000       | 23.25  |        | 10-145 |      |      |     |
| 13C12-PCB-114        | 2000       | 23.55  | 85     | 10-145 |      |      |     |
| 13C12-PCB-105        | 2000       | 23.90  | 84     | 10-145 |      |      |     |
| 13C12-PCB-126        | 2000       | 25.51  | 77     | 10-145 |      |      |     |
| 13C12-PCB-155        | 2000       | 20.48  | 40     | 10-145 |      |      |     |
| 13C12-PCB-167        | 2000       | 26.38  | 89     | 10-145 |      |      |     |
| 13C12-PCB-156/157    | 4000       | 27.02  | 91     | 10-145 |      |      |     |
| 13C12-PCB-169        | 2000       | 28.67  | 96     | 10-145 |      |      |     |
| 13C12-PCB-188        | 2000       | 23.48  | 55     | 10-145 |      |      |     |
| 13C12-PCB-189        | 2000       | 29.95  | 91     | 10-145 |      |      |     |
| 13C12-PCB-202        | 2000       | 26.26  | 55     | 10-145 |      |      |     |
| 13C12-PCB-205        | 2000       | 31.33  |        | 10-145 |      |      |     |
| 13C12-PCB-208        | 2000       | 29.67  | 44     | 10-145 |      |      |     |
| 13C12-PCB-206        | 2000       | 32.39  |        | 10-145 |      |      |     |
| 13C12-PCB-209        | 2000       | 33.50  |        | 10-145 |      |      |     |
| Cleanup Standards    |            |        |        |        |      |      |     |
| 12012 000 020        | 2000       | 16.04  | 75     | 5 445  |      |      |     |
| 13C12-PCB-028        | 2000       | 16.01  |        | 5-145  |      |      |     |
| 13C12-PCB-111        | 2000       | 22.01  |        | 10-145 |      |      |     |
| 13C12-PCB-178        | 2000       | 25.05  | 89     | 10-145 |      |      |     |

#### **ALS Life Sciences Sample Analysis Report** ENG-168-DFP-01 Sampling Date ALS Sample ID L2526958-8 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Swab **Run Information** Run 1 Filename 5-201130B31 01-Dec-20 07:19 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 7.20 0.57 200 Total DiCB 178 400 1.1 Total TriCB 133 400 Total TetraCB Total PentaCB 553 0.48 800 1490 0.64 800 Total HexaCB 912 Total HeptaCB 200 0.59 400 Total OctaCB 54.2 0.84 400 Total NonaCB 20.6 200 DecaCB 133 8.7 200 Total PCB 3680 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00862 Mid Point PCB TEO 0.153 Upper Bound PCB TEQ 0.295 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

В

EMPC

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

## Sample Analysis Report

 Sample Name
 DFP-BLANK

 ALS Sample ID
 L2526958-9

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

|                            | TEF        | Ret.             | Conc.        | EDL         |            | ЕМРС       |          |
|----------------------------|------------|------------------|--------------|-------------|------------|------------|----------|
| Target Analytes            | (WHO 2005) | Time             | conc.<br>pg  |             | lags       | рд         | LQL      |
|                            | (          |                  |              |             |            | P9         |          |
| PCB-001                    |            | NotFnd           | <1.6         | 1.6         | U          |            | 50       |
| PCB-002                    |            | 10.40            | <2.4         | 1.2         | J,R        |            | 50<br>50 |
| PCB-003<br>PCB-004         |            | 10.52<br>NotFnd  | <3.3<br><2.7 | 0.92<br>2.7 | J,R<br>U   | 3.3        | 50<br>50 |
| PCB-004<br>PCB-010         |            | NotFnd<br>NotFnd | <2.7<br><1.8 | 1.8         | U          |            | 50<br>50 |
| PCB-010<br>PCB-009         |            | NotFnd           | <1.8         | 1.8         | U          |            | 50       |
| PCB-009                    |            | NotFnd           | <1.7         | 1.7         | U          |            | 50       |
| PCB-007                    |            | 12.19            | 2.29         | 1.8         | j          |            | 50       |
| PCB-005                    |            | NotFnd           | <2.0         | 2.0         | Ú          |            | 50       |
| PCB-008                    |            | 12.46            | <4.8         | 1.6         | M,J,R      | 4.8        | 50       |
| PCB-014                    |            | NotFnd           | <1.8         | 1.8         | U          |            | 50       |
| PCB-011                    |            | 13.97            | 38.7         | 1.8         | J          |            | 50       |
| PCB-012/013                |            | NotFnd           | <1.9         | 1.9         | U          |            | 50       |
| PCB-015                    |            | NotFnd           | <2.2         | 2.2         | U          |            | 50       |
| PCB-019                    |            | NotFnd           | <0.85        | 0.85        | U          |            | 50       |
| PCB-018/030                |            | 13.74            | <2.5         | 0.96        | J,R        | 2.5        | 50       |
| PCB-017                    |            | 13.99            | <1.1         | 1.1         | M,U        | 0.98       | 50       |
| PCB-027                    |            | NotFnd           | < 0.84       | 0.84        | U          |            | 50       |
| PCB-024                    |            | NotFnd           | < 0.84       | 0.84        | U          |            | 50       |
| PCB-016                    |            | 14.29            | <2.0         | 1.4         | M,J,R      |            | 50       |
| PCB-032                    |            | 14.57            | <1.5         | 0.78        | J,R        | 1.5        | 50       |
| PCB-034                    |            | NotFnd           | <1.2         | 1.2         | U          |            | 50       |
| PCB-023                    |            | NotFnd           | <1.1         | 1.1         | U          |            | 50       |
| PCB-026/029                |            | 15.54            | <1.1         | 1.1         | U          | 1.0        | 50       |
| PCB-025                    |            | NotFnd           | <1.0         | 1.0         | U          |            | 50       |
| PCB-031                    |            | 15.86            | 5.02         | 1.1         | J,B        | E 2        | 50       |
| PCB-020/028<br>PCB-021/033 |            | 16.03<br>16.17   | <5.3<br><2.7 | 1.1<br>1.1  | J,R<br>J,R | 5.3<br>2.7 | 50<br>50 |
| PCB-021/033<br>PCB-022     |            | 16.17            | 2.28         | 1.1         | J,K        | 2./        | 51       |
| PCB-022<br>PCB-036         |            | NotFnd           | <1.1         | 1.1         | U          |            | 9        |
| PCB-039                    |            | NotFnd           | <1.1         | 1.1         | U          |            | 5        |
| PCB-039                    |            | NotFnd           | <1.2         | 1.2         | U          |            | 5        |
| PCB-035                    |            | NotFnd           | <1.3         | 1.3         | U          |            | 5        |
| PCB-037                    |            | 18.29            | <1.8         | 1.7         | J,R        | 1.8        | 5        |
| PCB-054                    |            | NotFnd           | < 0.58       | 0.58        | U          | 2.0        | 50       |
| PCB-050/053                |            | 15.67            | <1.1         | 1.1         | Ü          |            | 50       |
| PCB-045/051                |            | NotFnd           | <1.1         | 1.1         | U          |            | 50       |
| PCB-046                    |            | NotFnd           | <1.3         | 1.3         | U          |            | 50       |
| PCB-052                    |            | NotFnd           | <1.1         | 1.1         | U          |            | 50       |
| PCB-073                    |            | NotFnd           | < 0.85       | 0.85        | U          |            | 50       |
| PCB-043                    |            | NotFnd           | <1.5         | 1.5         | U          |            | 50       |
| PCB-049/069                |            | 17.26            | <1.2         | 1.0         | J,R        | 1.2        | 50       |
| PCB-048                    |            | NotFnd           | <1.2         | 1.2         | U          |            | 50       |
| PCB-044/047/065            |            | 17.57            | <4.6         | 1.1         | J,R        | 4.6        | 50       |
| PCB-059/062/075            |            | NotFnd           | <0.88        | 0.88        | U          |            | 50       |
| PCB-042                    |            | 17.86            | <1.3         | 1.3         | U          | 0.72       | 50       |
| PCB-040/041/071            |            | NotFnd           | <1.2         | 1.2         | U          |            | 50       |
| PCB-064                    |            | 18.26            | 1.26         | 0.89        | J          |            | 50       |
| PCB-072                    |            | NotFnd           | < 0.99       | 0.99        | U          |            | 50       |
| PCB-068                    |            | NotFnd           | <0.93        | 0.93        | U          |            | 50       |
| PCB-057                    |            | NotFnd           | <1.1         | 1.1         | U          |            | 50       |
| PCB-058                    |            | NotFnd           | < 0.97       | 0.97        | U          |            | 50       |
| PCB-067                    |            | NotFnd           | <0.89        | 0.89        | U          |            | 50       |
| PCB-063                    |            | NotFnd           | < 0.98       | 0.98        | U          | 2.0        | 50       |
| PCB-061/070/074/076        |            | 19.61            | <3.0         | 1.0         |            | 3.0        | 50<br>50 |
| PCB-066                    |            | 19.80            | <1.3         | 1.0         | M,J,R      | 1.3        | 50       |
| PCB-055<br>PCB-056         |            | NotFnd<br>20.19  | <1.1<br><2.0 | 1.1         | U<br>1 P   | 2.0        | 50       |
| PCB-060                    |            | 20.19<br>NotFnd  | <2.0<br><1.1 | 1.1         | J,R<br>U   | 2.0        | 50<br>50 |
| PCB-080                    |            | NotFnd           | <0.93        | 0.93        | U          |            | 50       |
| PCB-080<br>PCB-079         |            | NotFnd           | < 0.93       | 0.93        | U          |            | 50       |
| PCB-079                    |            | NotFnd           | <1.2         | 1.2         | U          |            | 50       |
| PCB-078                    | 0.0003     | NotFnd           | <1.3         | 1.3         | U          |            | 50       |
| PCB-081<br>PCB-077         | 0.0003     | NotFnd           | <1.4         | 1.4         | U          |            | 50       |
| PCB-104                    | 0.0001     | NotFnd           | <0.70        | 0.70        | U          |            | 50       |
| PCB-096                    |            | NotFnd           | <0.71        | 0.71        | U          |            | 50       |
| PCB-103                    |            | NotFnd           | <1.1         | 1.1         | U          |            | 50       |
| PCB-094                    |            | NotFnd           | <1.3         | 1.3         | Ü          |            | 50       |
| PCB-095                    |            | 19.14            | <1.3         | 1.1         |            | 1.3        | 50       |
| PCB-093/098/100/102        |            | NotFnd           | <1.2         | 1.2         | U          |            | 50       |

#### Sample Analysis Report

 Sample Name
 DFP-BLANK

 ALS Sample ID
 L2526958-9

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1 Sample
Percent Moisture n/a
Split Ratio 2

Approved: E. Sabljic --e-signature--01-Dec-2020

|                                                        | TEF               | Ret.             | Conc.          | EDL          |          | ЕМРС       |          |
|--------------------------------------------------------|-------------------|------------------|----------------|--------------|----------|------------|----------|
| Target Analytes                                        | TEF<br>(WHO 2005) | Ret.<br>Time     | Conc.<br>pg    |              | lags     | EMPC<br>Pg | LQL      |
|                                                        | ,                 |                  |                |              |          |            |          |
| PCB-088/091                                            |                   | NotFnd<br>NotFnd | <1.2           | 1.2          | U        |            | 50<br>50 |
| PCB-084<br>PCB-089                                     |                   | NotFnd<br>NotFnd | <1.4<br><1.4   | 1.4<br>1.4   | U        |            | 50<br>50 |
| PCB-121                                                |                   | NotFnd           | <0.91          | 0.91         | U        |            | 50       |
| PCB-092                                                |                   | NotFnd           | <1.3           | 1.3          | U        |            | 50       |
| PCB-090/101/113                                        |                   | 20.65            | 2.25           | 1.1          | М,Ј,В    |            | 50       |
| PCB-083/099                                            |                   | NotFnd           | <1.3           | 1.3          | U        |            | 50       |
| PCB-112                                                |                   | NotFnd           | < 0.96         | 0.96         | U        |            | 50       |
| PCB-086/087/097/109/119/125<br>PCB-085/110/115/116/117 |                   | NotFnd<br>21.73  | <1.1<br><2.5   | 1.1<br>1.1   | U<br>J,R |            | 50<br>50 |
| PCB-085/110/115/116/117<br>PCB-082                     |                   | NotFnd           | <2.5<br><1.8   | 1.1          | J,K<br>U |            | 50       |
| PCB-111                                                |                   | NotFnd           | < 0.98         | 0.98         | U        |            | 50       |
| PCB-120                                                |                   | NotFnd           | < 0.98         | 0.98         | U        |            | 50       |
| PCB-108/124                                            |                   | NotFnd           | <1.2           | 1.2          | U        |            | 50       |
| PCB-107                                                |                   | NotFnd           | <1.1           | 1.1          | U        |            | 50       |
| PCB-123                                                | 0.00003           | NotFnd           | <1.3           | 1.3          | U        |            | 50       |
| PCB-106                                                | 0.00000           | NotFnd           | <1.3           | 1.3          | U        |            | 50       |
| PCB-118<br>PCB-122                                     | 0.00003           | NotFnd           | <1.3<br><1.4   | 1.3<br>1.4   | U        |            | 50<br>50 |
| PCB-122<br>PCB-114                                     | 0.00003           | NotFnd<br>NotFnd | <1.4           | 1.4          | U        |            | 50       |
| PCB-105                                                | 0.00003           | NotFnd           | <1.4           | 1.4          | U        |            | 50       |
| PCB-127                                                |                   | NotFnd           | <1.3           | 1.3          | Ü        |            | 50       |
| PCB-126                                                | 0.1               | NotFnd           | <1.7           | 1.7          | U        |            | 50       |
| PCB-155                                                |                   | NotFnd           | < 0.44         | 0.44         | U        |            | 50       |
| PCB-152                                                |                   | NotFnd           | < 0.53         | 0.53         | U        |            | 50       |
| PCB-150                                                |                   | NotFnd           | < 0.51         | 0.51         | U        |            | 50       |
| PCB-136                                                |                   | NotFnd           | < 0.55         | 0.55         | U        |            | 50<br>50 |
| PCB-145<br>PCB-148                                     |                   | NotFnd<br>NotFnd | <0.55<br><0.78 | 0.55<br>0.78 | U        |            | 50       |
| PCB-135/151                                            |                   | NotFnd           | <0.83          | 0.78         | U        |            | 50       |
| PCB-154                                                |                   | NotFnd           | < 0.65         | 0.65         | U        |            | 50       |
| PCB-144                                                |                   | NotFnd           | < 0.84         | 0.84         | U        |            | 50       |
| PCB-147/149                                            |                   | 22.67            | <1.9           | 0.79         | J,R      | 1.9        | 50       |
| PCB-134/143                                            |                   | NotFnd           | < 0.97         | 0.97         | U        |            | 50       |
| PCB-139/140                                            |                   | NotFnd           | <0.80          | 0.80         | U        |            | 50       |
| PCB-131                                                |                   | NotFnd           | <1.0           | 1.0          | U        |            | 50       |
| PCB-142                                                |                   | NotFnd           | < 0.97         | 0.97         | U        |            | 50<br>50 |
| PCB-132<br>PCB-133                                     |                   | NotFnd<br>NotFnd | <0.96<br><0.92 | 0.96<br>0.92 | U        |            | 50<br>50 |
| PCB-165                                                |                   | NotFnd           | <0.71          | 0.71         | U        |            | 50       |
| PCB-146                                                |                   | NotFnd           | < 0.80         | 0.80         | U        |            | 50       |
| PCB-161                                                |                   | NotFnd           | <0.68          | 0.68         | U        |            | 50       |
| PCB-153/168                                            |                   | 24.18            | 1.73           | 0.71         | J,B      |            | 50       |
| PCB-141                                                |                   | NotFnd           | < 0.93         | 0.93         | U        |            | 50       |
| PCB-130                                                |                   | NotFnd           | <1.1           | 1.1          | U        |            | 50       |
| PCB-137/164                                            |                   | NotFnd           | < 0.81         | 0.81         | U        |            | 50       |
| PCB-129/138/163<br>PCB-160                             |                   | 24.88<br>NotFnd  | <1.3<br><0.75  | 0.92<br>0.75 | J,R<br>U |            | 50<br>50 |
| PCB-158                                                |                   | NotFnd           | <0.75          | 0.75         | U        |            | 50       |
| PCB-128/166                                            |                   | NotFnd           | < 0.83         | 0.83         | U        |            | 50       |
| PCB-159                                                |                   | NotFnd           | < 0.71         | 0.71         | Ū        |            | 50       |
| PCB-162                                                |                   | NotFnd           | < 0.74         | 0.74         | U        |            | 50       |
| PCB-167                                                | 0.00003           | NotFnd           | < 0.65         | 0.65         | U        |            | 50       |
| PCB-156/157                                            | 0.00003           | NotFnd           | < 0.90         | 0.90         | U        |            | 100      |
| PCB-169                                                | 0.03              | NotFnd           | < 0.79         | 0.79         | U        |            | 50       |
| PCB-188                                                |                   | NotFnd           | < 0.54         | 0.54         | U        |            | 50       |
| PCB-179<br>PCB-184                                     |                   | NotFnd<br>NotFnd | <0.59<br><0.53 | 0.59<br>0.53 | U        |            | 50<br>50 |
| PCB-184<br>PCB-176                                     |                   | NotFnd           | < 0.60         | 0.53         | U        |            | 50       |
| PCB-176                                                |                   | NotFnd           | < 0.61         | 0.61         | U        |            | 50       |
| PCB-178                                                |                   | NotFnd           | < 0.90         | 0.90         | U        |            | 50       |
| PCB-175                                                |                   | NotFnd           | < 0.90         | 0.90         | U        |            | 50       |
| PCB-187                                                |                   | NotFnd           | < 0.77         | 0.77         | U        |            | 50       |
| PCB-182                                                |                   | NotFnd           | < 0.84         | 0.84         | U        |            | 50       |
| PCB-183                                                |                   | NotFnd           | < 0.84         | 0.84         | U        |            | 50       |
| PCB-185                                                |                   | NotFnd           | <0.86          | 0.86         | U        |            | 50       |
| PCB-174                                                |                   | NotFnd           | < 0.91         | 0.91         | U        |            | 50       |
| PCB-177                                                |                   | NotFnd           | < 0.96         | 0.96         | U        |            | 50       |
| PCB-181<br>PCB-171/173                                 |                   | NotFnd<br>NotFnd | <0.90<br><0.99 | 0.90<br>0.99 | U        |            | 50<br>50 |
| PCB-171/173<br>PCB-172                                 |                   | NotFnd           | < 0.99         | 0.99         | U        |            | 50       |

#### Sample Analysis Report

 Sample Name
 DFP-BLANK

 ALS Sample ID
 L2526958-9

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

Sample Size 1 Sample
Percent Moisture n/a
Split Ratio 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 $\begin{array}{c|cccc} \textbf{Run Information} & \textbf{Run I} \\ \hline \textbf{Filename} & 5-201130B24 \\ \textbf{Run Date} & 01-be-202224 \\ \hline \textbf{Final Volume} & 25 & ul \\ \hline \end{array}$ 

 Final Volume
 25

 Dilution Factor
 1

 Analysis Units
 pg

|                        | TEF        | Ret.   | Conc.  | EDL    |       | EMPC  |     |
|------------------------|------------|--------|--------|--------|-------|-------|-----|
| Target Analytes        | (WHO 2005) | Time   | pg     | pg I   | Flags | pg    | LQL |
| PCB-192                |            | NotFnd | <0.76  | 0.76   |       | U     | 50  |
| PCB-192<br>PCB-180/193 |            | NotFnd | <0.75  | 0.75   |       | U     | 50  |
|                        |            |        |        |        |       |       |     |
| PCB-191                |            | NotFnd | < 0.64 | 0.64   |       | IJ    | 50  |
| PCB-170                |            | NotFnd | < 0.75 | 0.75   |       | IJ    | 50  |
| PCB-190                | 0.005      | NotFnd | < 0.47 | 0.47   |       | U     | 50  |
| PCB-189                | 0.00003    | NotFnd | <0.50  | 0.50   |       | U     | 50  |
| PCB-202                |            | NotFnd | <0.88  | 0.88   |       | U     | 50  |
| PCB-201                |            | NotFnd | < 0.90 | 0.90   |       | U     | 50  |
| PCB-204                |            | NotFnd | < 0.90 | 0.90   |       | U     | 50  |
| PCB-197                |            | NotFnd | <0.88  | 0.88   |       | U     | 50  |
| PCB-200                |            | NotFnd | < 0.92 | 0.92   |       | U     | 50  |
| PCB-198/199            |            | NotFnd | <0.88  | 0.88   |       | U     | 50  |
| PCB-196                |            | NotFnd | <0.86  | 0.86   |       | U     | 50  |
| PCB-203                |            | NotFnd | < 0.85 | 0.85   |       | U     | 50  |
| PCB-195                |            | NotFnd | < 0.71 | 0.71   |       | U     | 50  |
| PCB-194                |            | 31.08  | <1.5   | 0.75   | М,Ј,  | R 1.5 | 50  |
| PCB-205                |            | NotFnd | < 0.68 | 0.68   |       | U     | 50  |
| PCB-208                |            | NotFnd | <1.6   | 1.6    |       | U     | 50  |
| PCB-207                |            | NotFnd | <1.7   | 1.7    |       | U     | 50  |
| PCB-206                |            | 32.43  | 4.75   | 2.6    |       | j     | 50  |
| PCB-209                |            | 33.54  | 59.5   | 3.5    |       | В     | 50  |
| 1 05 203               |            | 55.51  | 33.3   | 5.5    |       |       | 30  |
| Extraction Standards   | pg         | Time   | % Rec  | Limits |       |       |     |
|                        |            |        |        |        |       |       |     |
| 13C12-PCB-001          | 2000       | 8.94   | 54     | 5-145  |       |       |     |
| 13C12-PCB-003          | 2000       | 10.51  | 53     | 5-145  |       |       |     |
| 13C12-PCB-004          | 2000       | 10.66  | 61     | 5-145  |       |       |     |
| 13C12-PCB-015          | 2000       | 14.34  | 53     | 5-145  |       |       |     |
| 13C12-PCB-019          | 2000       | 12.64  | 64     | 5-145  |       |       |     |
| 13C12-PCB-037          | 2000       | 18.27  | 57     | 5-145  |       |       |     |
| 13C12-PCB-054          | 2000       |        | 73     |        |       |       |     |
|                        |            | 14.48  |        |        |       |       |     |
| 13C12-PCB-081          | 2000       | 21.83  |        | 10-145 |       |       |     |
| 13C12-PCB-077          | 2000       | 22.14  |        | 10-145 |       |       |     |
| 13C12-PCB-104          | 2000       | 17.51  |        | 10-145 |       |       |     |
| 13C12-PCB-123          | 2000       | 23.09  |        | 10-145 |       |       |     |
| 13C12-PCB-118          | 2000       | 23.26  |        | 10-145 |       |       |     |
| 13C12-PCB-114          | 2000       | 23.56  |        | 10-145 |       |       |     |
| 13C12-PCB-105          | 2000       | 23.91  |        | 10-145 |       |       |     |
| 13C12-PCB-126          | 2000       | 25.52  | 64     | 10-145 |       |       |     |
| 13C12-PCB-155          | 2000       | 20.49  | 71     | 10-145 |       |       |     |
| 13C12-PCB-167          | 2000       | 26.39  | 76     | 10-145 |       |       |     |
| 13C12-PCB-156/157      | 4000       | 27.03  |        | 10-145 |       |       |     |
| 13C12-PCB-169          | 2000       | 28.69  |        | 10-145 |       |       |     |
| 13C12-PCB-188          | 2000       | 23.49  |        | 10-145 |       |       |     |
| 13C12-PCB-189          | 2000       | 29.95  |        | 10-145 |       |       |     |
| 13C12-PCB-202          | 2000       | 26.26  |        | 10-145 |       |       |     |
| 13C12-PCB-202          | 2000       | 31.33  |        | 10-145 |       |       |     |
| 13C12-PCB-208          | 2000       | 29.68  |        | 10-145 |       |       |     |
|                        |            |        |        |        |       |       |     |
| 13C12-PCB-206          | 2000       | 32.40  |        | 10-145 |       |       |     |
| 13C12-PCB-209          | 2000       | 33.51  | 62     | 10-145 |       |       |     |
| Cleanup Standards      |            |        |        |        |       |       |     |
| 13C12-PCB-028          | 2000       | 16.01  | 64     | 5-145  |       |       |     |
| 13C12-PCB-111          | 2000       | 22.02  |        | 10-145 |       |       |     |
| 13C12-PCB-111          | 2000       | 25.06  |        | 10-145 |       |       |     |
|                        |            |        |        |        |       |       |     |

#### **ALS Life Sciences Sample Analysis Report** DFP-BLANK Sampling Date ALS Sample ID L2526958-9 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B24 Run Date 01-Dec-20 02:24 Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 5.70 0.92 200 Total DiCB 45.8 1.6 400 Total TriCB 23.1 0.78 400 Total TetraCB Total PentaCB 13.4 0.58 800 6.05 800 0.70 Total HexaCB 4.93 Total HeptaCB < 0.47 0.47 U 400 Total OctaCB 1.50 0.68 400 Total NonaCB 200 1.6 DecaCB 59.5 3.5 200 Total PCB 165 1600 Toxic Equivalency - (WHO 2005) 0.00 0.0972 Lower Bound PCB TEQ Mid Point PCB TEO Upper Bound PCB TEQ 0.194 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions. Indicates that a peak has been manually integrated. U Indicates that this compound was not detected above the EDL. Indicates that the analyte was positively identifed. The associated numerical result is an estimate. Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration. В Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

EMPC

#### Sample Analysis Report

ENG-159-DFP-1 ALS Sample ID L2526958-10 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Sample Size Percent Moisture Sample n/a Split Ratio

Approved: E. Sabljic --e-signature--01-Dec-2020

Run Information Run 1 Filename Run Date 5-201130B32 01-Dec-20 08:02 Final Volume 25

Dilution Factor Analysis Units

pg HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                        | TEF        | Ret.             | Conc.         | EDL        |        | EMPC |          |
|------------------------|------------|------------------|---------------|------------|--------|------|----------|
| Target Analytes        | (WHO 2005) | Time             | pg            |            | Flags  | pg   | LQL      |
|                        |            |                  |               |            |        |      |          |
| PCB-001<br>PCB-002     |            | NotFnd<br>NotFnd | <3.1<br><3.6  | 3.1<br>3.6 | L      |      | 50<br>50 |
| PCB-002<br>PCB-003     |            | NotFnd           | <3.6<br><3.7  | 3.6        | Ĺ      |      | 50       |
| PCB-003<br>PCB-004     |            | NotFnd           | <12           | 12         | Ĺ      |      | 50       |
| PCB-004                |            | NotFnd           | <8.3          | 8.3        | Ĺ      |      | 50       |
| PCB-010                |            | NotFnd           | <8.3          | 8.3        | Ĺ      |      | 50       |
| PCB-007                |            | NotFnd           | <8.1          | 8.1        | Ĺ      |      | 50       |
| PCB-007                |            | NotFnd           | <8.5          | 8.5        | l      |      | 50       |
| PCB-005                |            | NotFnd           | <9.6          | 9.6        | Ü      |      | 50       |
| PCB-008                |            | 12.44            | <9.6          | 7.7        | M,J,F  |      | 50       |
| PCB-014                |            | NotFnd           | <10           | 10         | ,,,,,  |      | 50       |
| PCB-011                |            | 13.97            | 948           | 10         | Ņ      |      | 50       |
| PCB-012/013            |            | NotFnd           | <10           | 10         | Ĺ      |      | 50       |
| PCB-015                |            | NotFnd           | <14           | 14         | Ĺ      |      | 50       |
| PCB-019                |            | NotFnd           | <4.9          | 4.9        | L      |      | 50       |
| PCB-018/030            |            | 13.74            | <8.4          | 4.9        | J,F    | 8.4  | 50       |
| PCB-017                |            | NotFnd           | < 5.7         | 5.7        | L      |      | 50       |
| PCB-027                |            | NotFnd           | <4.2          | 4.2        | ι      |      | 50       |
| PCB-024                |            | NotFnd           | <4.2          | 4.2        | L      |      | 50       |
| PCB-016                |            | NotFnd           | < 6.9         | 6.9        | L      |      | 50       |
| PCB-032                |            | NotFnd           | <4.0          | 4.0        | L      |      | 50       |
| PCB-034                |            | NotFnd           | <5.2          | 5.2        | L      |      | 50       |
| PCB-023                |            | NotFnd           | <4.9          | 4.9        | L      |      | 50       |
| PCB-026/029            |            | NotFnd           | <4.9          | 4.9        | L      |      | 50       |
| PCB-025                |            | NotFnd           | <4.4          | 4.4        | L      |      | 50       |
| PCB-031                |            | 15.86            | 17.3          | 4.5        | J,E    |      | 50       |
| PCB-020/028            |            | NotFnd           | <4.8          | 4.8        | L.     |      | 50       |
| PCB-021/033            |            | NotFnd           | <4.7          | 4.7        |        |      | 50       |
| PCB-022                |            | 16.40            | < 5.1         | 5.1        | M,L    |      | 50       |
| PCB-036                |            | NotFnd           | <4.8          | 4.8        | L      |      | 50       |
| PCB-039                |            | NotFnd           | <4.9          | 4.9        | L      |      | 50       |
| PCB-038                |            | NotFnd           | < 5.3         | 5.3        | 1.     |      | 50       |
| PCB-035                |            | 18.08            | <7.4          | 5.6        |        | 7.4  | 50       |
| PCB-037                |            | 18.30            | 17.3          | 7.4        | М,.    |      | 50       |
| PCB-054<br>PCB-050/053 |            | NotFnd<br>15.69  | <2.0<br><2.9  | 2.0<br>2.9 | L<br>L |      | 50<br>50 |
| PCB-045/051            |            | NotFnd           | <3.0          | 3.0        | Ĺ      |      | 50       |
| PCB-045/051<br>PCB-046 |            | NotFnd           | <3.5          | 3.5        | Ĺ      |      | 50       |
| PCB-040<br>PCB-052     |            | 17.00            | 26.2          | 3.1        | J,E    |      | 50       |
| PCB-073                |            | NotFnd           | <2.3          | 2.3        | ا,د    |      | 50       |
| PCB-043                |            | NotFnd           | <4.0          | 4.0        | Ĺ      |      | 50       |
| PCB-049/069            |            | 17.28            | <8.6          | 2.8        |        | 8.6  | 50       |
| PCB-048                |            | 17.43            | <3.1          | 3.1        | ٠,,    |      | 50       |
| PCB-044/047/065        |            | 17.58            | 20.3          | 2.9        | J,E    |      | 50       |
| PCB-059/062/075        |            | NotFnd           | <2.4          | 2.4        | ί.     |      | 50       |
| PCB-042                |            | 17.89            | <3.6          | 3.6        | L      |      | 50       |
| PCB-040/041/071        |            | 18.17            | 9.92          | 3.3        | M,J,E  |      | 50       |
| PCB-064                |            | 18.25            | 8.37          | 2.4        |        |      | 50       |
| PCB-072                |            | NotFnd           | <2.9          | 2.9        | L      |      | 50       |
| PCB-068                |            | NotFnd           | <2.7          | 2.7        | L      |      | 50       |
| PCB-057                |            | NotFnd           | <3.1          | 3.1        | L      |      | 50       |
| PCB-058                |            | NotFnd           | <2.8          | 2.8        | L      |      | 50       |
| PCB-067                |            | NotFnd           | <2.6          | 2.6        | L      |      | 50       |
| PCB-063                |            | NotFnd           | <2.9          | 2.9        | L      |      | 50       |
| PCB-061/070/074/076    |            | 19.61            | 54.5          | 3.0        |        |      | 50       |
| PCB-066                |            | 19.79            | 23.1          | 2.9        | -      |      | 50       |
| PCB-055                |            | NotFnd           | <3.2          | 3.2        |        |      | 50       |
| PCB-056                |            | 20.17            | <15           | 3.2        |        | . 15 | 50       |
| PCB-060                |            | 20.29            | 9.44          | 3.1        | М,.    |      | 50       |
| PCB-080                |            | NotFnd           | <2.7          | 2.7        |        |      | 50       |
| PCB-079                |            | NotFnd           | <2.9          | 2.9        | L.     |      | 50       |
| PCB-078                | 0.0003     | NotFnd           | <3.4          | 3.4        | L      |      | 50       |
| PCB-081                | 0.0003     | NotFnd           | <3.3          | 3.3        | 1.     |      | 50       |
| PCB-077                | 0.0001     | 22.15            | <8.7          | 3.6        |        | 8.7  | 50       |
| PCB-104                |            | NotFnd           | < 2.5         | 2.5        | L      |      | 50       |
| PCB-096                |            | NotFnd           | <2.1          | 2.1        | L      |      | 50       |
| PCB-103<br>PCB-094     |            | NotFnd<br>NotFnd | <3.4<br><3.9  | 3.4        | Ĺ      |      | 50<br>50 |
| PCB-094<br>PCB-095     |            | 19.13            | < 3.9<br>26.3 | 3.9<br>3.6 | :      |      | 50       |
| PCB-093/098/100/102    |            | NotFnd           | 26.3<br><3.7  | 3.6        | ·      |      | 50<br>50 |
| . 65 655/656/100/102   |            | 1100 110         | -3.7          | 3.7        |        |      | 50       |

#### Sample Analysis Report

ENG-159-DFP-1 ALS Sample ID L2526958-10 Analysis Method EPA 1668C Analysis Type Sample Sample Matrix Swab

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Sample E. Sabljic n/a --e-signature--01-Dec-2020 Split Ratio

**Run Information** Run 1 Filename Run Date 5-201130B32 01-Dec-20 08:02 Final Volume 25 Dilution Factor Analysis Units pg

HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                             | TEF        | Ret.             | Conc.        | EDL        |            | EMPC |          |
|-----------------------------|------------|------------------|--------------|------------|------------|------|----------|
| Target Analytes             | (WHO 2005) | Time             | pg           | pg F       | lags       | pg   | LQL      |
|                             | ,          |                  |              |            |            |      |          |
| PCB-088/091<br>PCB-084      |            | NotFnd<br>19.74  | <3.8<br><10  | 3.8<br>4.3 | U<br>J,R   |      | 50<br>50 |
| PCB-089                     |            | NotFnd           | <4.3         | 4.3        | U          |      | 50       |
| PCB-121                     |            | NotFnd           | <2.8         | 2.8        | U          |      | 50       |
| PCB-092                     |            | NotFnd           | <4.2         | 4.2        | U          |      | 50       |
| PCB-090/101/113             |            | 20.65            | 47.7         | 3.4        | j          |      | 50       |
| PCB-083/099<br>PCB-112      |            | 20.95<br>NotFnd  | 26.5<br><3.0 | 4.2<br>3.0 | J<br>U     |      | 50<br>50 |
| PCB-086/087/097/109/119/125 |            | 21.30            | 45.2         | 3.6        | M,J        |      | 50       |
| PCB-085/110/115/116/117     |            | 21.72            | 96.7         | 3.4        | М          |      | 50       |
| PCB-082                     |            | 21.92            | <12          | 5.5        | M,J,R      | 12   | 50       |
| PCB-111                     |            | NotFnd           | <3.1         | 3.1        | U          |      | 50       |
| PCB-120                     |            | NotFnd           | <3.0         | 3.0        | U          |      | 50       |
| PCB-108/124                 |            | NotFnd           | <4.3         | 4.3        | U          |      | 50<br>50 |
| PCB-107<br>PCB-123          | 0.00003    | 23.03<br>NotFnd  | <5.8<br><4.4 | 3.7<br>4.4 | M,J,R<br>U |      | 50       |
| PCB-125                     | 0.00003    | NotFnd           | <4.5         | 4.5        | U          |      | 50       |
| PCB-118                     | 0.00003    | 23.26            | 89.4         | 4.2        | _          |      | 50       |
| PCB-122                     |            | NotFnd           | <4.8         | 4.8        | U          |      | 50       |
| PCB-114                     | 0.00003    | NotFnd           | <4.2         | 4.2        | U          |      | 50       |
| PCB-105                     | 0.00003    | 23.93            | <33          | 4.4        | J,R        |      | 50       |
| PCB-127                     |            | NotFnd           | <4.7         | 4.7        | U          |      | 50       |
| PCB-126                     | 0.1        | 25.54            | <7.6         | 5.2        | M,J,R      |      | 50       |
| PCB-155<br>PCB-152          |            | NotFnd<br>NotFnd | <2.3<br><1.2 | 2.3<br>1.2 | U          |      | 50<br>50 |
| PCB-150                     |            | NotFnd           | <1.1         | 1.1        | U          |      | 50       |
| PCB-136                     |            | 20.97            | <6.2         | 1.2        | J,R        |      | 50       |
| PCB-145                     |            | NotFnd           | <1.2         | 1.2        | U          |      | 50       |
| PCB-148                     |            | NotFnd           | <1.7         | 1.7        | U          |      | 50       |
| PCB-135/151                 |            | 22.19            | 20.5         | 1.8        | M,J        |      | 50       |
| PCB-154                     |            | NotFnd           | <1.4         | 1.4        | U          |      | 50       |
| PCB-144<br>PCB-147/149      |            | 22.46<br>22.66   | 3.21<br>66.0 | 1.8<br>5.3 | J          |      | 50<br>50 |
| PCB-147/149<br>PCB-134/143  |            | 22.78            | <6.5         | 6.5        | U          | 4.4  | 50       |
| PCB-139/140                 |            | NotFnd           | <5.4         | 5.4        | U          |      | 50       |
| PCB-131                     |            | NotFnd           | <6.7         | 6.7        | U          |      | 50       |
| PCB-142                     |            | NotFnd           | <6.5         | 6.5        | U          |      | 50       |
| PCB-132                     |            | 23.36            | <30          | 6.4        | J,R        |      | 50       |
| PCB-133                     |            | NotFnd           | <6.2         | 6.2        | U          |      | 50       |
| PCB-165                     |            | NotFnd           | <4.8         | 4.8        | U          |      | 50       |
| PCB-146<br>PCB-161          |            | 23.87<br>NotFnd  | 14.5<br><4.6 | 5.4<br>4.6 | J<br>U     |      | 50<br>50 |
| PCB-153/168                 |            | 24.18            | 79.0         | 4.7        | J          |      | 50       |
| PCB-141                     |            | 24.32            | <21          | 6.3        | M,J,R      | 21   | 50       |
| PCB-130                     |            | 24.54            | 10.1         | 7.5        | j          |      | 50       |
| PCB-137/164                 |            | 24.71            | <14          | 5.4        | M,J,R      | 14   | 50       |
| PCB-129/138/163             |            | 24.88            | 127          | 6.2        |            |      | 50       |
| PCB-160                     |            | NotFnd           | < 5.0        | 5.0        | U          |      | 50       |
| PCB-158<br>PCB-128/166      |            | 25.07<br>25.57   | <13<br>20.7  | 4.1<br>5.6 | J,R<br>J   |      | 50<br>50 |
| PCB-128/166<br>PCB-159      |            | 25.57<br>NotFnd  | <4.8         | 4.8        | U          |      | 50       |
| PCB-162                     |            | NotFnd           | <5.0         | 5.0        | U          |      | 50       |
| PCB-167                     | 0.00003    | 26.40            | 5.41         | 4.0        | J          |      | 50       |
| PCB-156/157                 | 0.00003    | 27.01            | 13.4         | 5.3        | J,B        |      | 100      |
| PCB-169                     | 0.03       | NotFnd           | <4.0         | 4.0        | U          |      | 50       |
| PCB-188                     |            | NotFnd           | <2.9         | 2.9        | U          |      | 50       |
| PCB-179<br>PCB-184          |            | 23.72<br>NotFnd  | <6.1<br><1.8 | 2.1<br>1.8 | J,R<br>U   |      | 50<br>50 |
| PCB-176                     |            | NotFnd           | <2.1         | 2.1        | U          |      | 50       |
| PCB-186                     |            | NotFnd           | <2.1         | 2.1        | U          |      | 50       |
| PCB-178                     |            | NotFnd           | <3.2         | 3.2        | U          |      | 50       |
| PCB-175                     |            | NotFnd           | <3.1         | 3.1        | U          |      | 50       |
| PCB-187                     |            | 25.52            | 32.7         | 2.7        | J          |      | 50       |
| PCB-182                     |            | NotFnd           | <2.9         | 2.9        | U          |      | 50       |
| PCB-183                     |            | 25.85            | <8.5         | 3.0        |            | 8.5  | 50       |
| PCB-185                     |            | NotFnd           | <3.0         | 3.0        | U          |      | 50       |
| PCB-174<br>PCB-177          |            | 26.00<br>26.23   | <21<br>13.9  | 3.2        | J,R        |      | 50<br>50 |
| PCB-177<br>PCB-181          |            | 26.23<br>NotFnd  | <3.2         | 3.4<br>3.2 | J<br>U     |      | 50<br>50 |
| PCB-171/173                 |            | 26.57            | 10.0         | 3.5        | J          |      | 50       |
| PCB-172                     |            | 27.35            | <3.6         | 3.5        |            | 3.6  | 50       |

#### **Sample Analysis Report**

 Sample Name
 ENG-159-DFP-1

 ALS Sample ID
 L2526958-10

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run 1

 Filename
 5-201130B32

 Run Date
 01-Dec-20 08:02

 Final Volume
 25 ul

 Dilution Factor
 1

 Analysis Units
 pg

|                                | TEF        | Ret.   | Conc. | EDL    |       | EMPC |     |
|--------------------------------|------------|--------|-------|--------|-------|------|-----|
| Target Analytes                | (WHO 2005) | Time   | pg    | pg     | Flags | pg   | LQL |
| PCB-192                        |            | NotFnd | <2.7  | 2.7    | ι     |      | 50  |
| PCB-192                        |            | 27.68  | <63   | 2.6    | F     |      | 50  |
| PCB-191                        |            | 27.84  | <2.3  | 2.3    | Ü     |      | 50  |
| PCB-171                        |            | 28.38  | 22.2  | 2.6    | :     |      | 50  |
| PCB-170<br>PCB-190             |            | 28.64  | 3.92  | 1.6    | М,    |      | 50  |
| PCB-190<br>PCB-189             | 0.00003    | NotFnd | <1.1  | 1.1    | ۱۳۱٫۰ |      | 50  |
|                                | 0.00003    |        |       |        |       |      |     |
| PCB-202                        |            | 26.26  | 7.83  | 3.4    |       |      | 50  |
| PCB-201                        |            | NotFnd | < 2.5 | 2.5    | L     |      | 50  |
| PCB-204                        |            | NotFnd | <2.5  | 2.5    | L.    |      | 50  |
| PCB-197                        |            | NotFnd | <2.5  | 2.5    | L.    |      | 50  |
| PCB-200                        |            | NotFnd | <2.6  | 2.6    | U     |      | 50  |
| PCB-198/199                    |            | 28.69  | 20.2  | 2.5    | -     |      | 50  |
| PCB-196                        |            | 29.01  | 6.35  | 2.4    | -     |      | 50  |
| PCB-203                        |            | 29.12  | 9.06  | 2.4    | -     |      | 50  |
| PCB-195                        |            | 29.85  | <3.0  | 2.1    |       | 3.0  | 50  |
| PCB-194                        |            | 31.06  | 14.2  | 2.2    | -     |      | 50  |
| PCB-205                        |            | NotFnd | <1.6  | 1.6    | L     |      | 50  |
| PCB-208                        |            | 29.69  | 23.0  | 8.0    | -     |      | 50  |
| PCB-207                        |            | 30.15  | <11   | 5.9    | M,J,F |      | 50  |
| PCB-206                        |            | 32.40  | 31.9  | 6.4    | -     |      | 50  |
| PCB-209                        |            | NotFnd | <5300 | 5300   | L     |      | 50  |
|                                |            |        |       |        |       |      |     |
| Extraction Standards           | pg         | Time   | % Rec | Limits |       |      |     |
| 13C12-PCB-001                  | 2000       | 8.95   | 51    | 5-145  | R     |      |     |
| 13C12-PCB-003                  | 2000       | 10.49  | 44    | 5-145  |       |      |     |
| 13C12-PCB-004                  | 2000       | 10.63  | 54    | 5-145  |       |      |     |
| 13C12-PCB-015                  | 2000       | 14.36  | 49    | 5-145  |       |      |     |
| 13C12-PCB-019                  | 2000       | 12.62  | 63    | 5-145  |       |      |     |
| 13C12-PCB-037                  | 2000       | 18.30  | 54    | 5-145  |       |      |     |
| 13C12-PCB-054                  | 2000       | 14.46  |       | 5-145  |       |      |     |
| 13C12-PCB-081                  | 2000       | 21.83  |       | 10-145 |       |      |     |
| 13C12-PCB-077                  | 2000       | 22.13  |       | 10-145 |       |      |     |
| 13C12-PCB-104                  | 2000       | 17.50  |       | 10-145 |       |      |     |
| 13C12-PCB-104                  | 2000       | 23.08  |       | 10-145 |       |      |     |
| 13C12-PCB-118                  | 2000       | 23.25  |       | 10-145 |       |      |     |
| 13C12-PCB-114                  | 2000       | 23.25  |       | 10-145 |       |      |     |
| 13C12-PCB-114<br>13C12-PCB-105 | 2000       | 23.55  |       | 10-145 |       |      |     |
|                                |            | 25.52  |       | 10-145 |       |      |     |
| 13C12-PCB-126                  | 2000       | 25.52  |       |        |       |      |     |
| 13C12-PCB-155                  | 2000       |        |       | 10-145 |       |      |     |
| 13C12-PCB-167                  | 2000       | 26.39  |       | 10-145 |       |      |     |
| 13C12-PCB-156/157              | 4000       | 27.02  |       | 10-145 |       |      |     |
| 13C12-PCB-169                  | 2000       | 28.69  |       | 10-145 |       |      |     |
| 13C12-PCB-188                  | 2000       | 23.48  |       | 10-145 |       |      |     |
| 13C12-PCB-189                  | 2000       | 29.95  |       | 10-145 |       |      |     |
| 13C12-PCB-202                  | 2000       | 26.26  |       | 10-145 |       |      |     |
| 13C12-PCB-205                  | 2000       | 31.33  |       | 10-145 |       |      |     |
| 13C12-PCB-208                  | 2000       | 29.67  |       | 10-145 |       |      |     |
| 13C12-PCB-206                  | 2000       | 32.39  |       | 10-145 |       |      |     |
| 13C12-PCB-209                  | 2000       | 33.66  | 0     | 10-145 |       |      |     |
| Cleanup Standards              |            |        |       |        |       |      |     |
| 13C12-PCB-028                  | 2000       | 16.02  | 66    | 5-145  |       |      |     |
| 13C12-PCB-111                  | 2000       | 22.01  |       | 10-145 |       |      |     |
| 13C12-PCB-178                  | 2000       | 25.05  |       | 10-145 |       |      |     |
|                                |            |        |       |        |       |      |     |

#### **ALS Life Sciences Sample Analysis Report** ENG-159-DFP-1 Sampling Date ALS Sample ID L2526958-10 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Swab **Run Information** Run 1 Filename 5-201130B32 01-Dec-20 08:02 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB <3.1 3.1 U 200 Total DiCB 958 400 7.7 Total TriCB 400 Total TetraCB Total PentaCB 184 400 2.0 800 800 2.1 Total HexaCB Total HeptaCB 185 1.1 400 Total OctaCB 60.6 400 1.6 Total NonaCB 65.9 5.9 200 DecaCB <5300 5300 U 200 Total PCB 2350 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00325 Mid Point PCB TEO 0.826 Upper Bound PCB TEQ 0.886 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

U

В

EMPC

#### Sample Analysis Report

 Sample Name
 ENG-583-DFP-01

 ALS Sample ID
 L2526958-11

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run 1

 Filename
 5-2011 30E15

 Run Date
 30-Nov-20 19:54

 Final Volume
 25 ul

 Dilution Factor
 1

 Analysis Units
 pg

|                                | TEF        | Ret.            | Conc.         | EDL          |            | ЕМРС     |          |
|--------------------------------|------------|-----------------|---------------|--------------|------------|----------|----------|
| Target Analytes                | (WHO 2005) | Time            | pg            |              | Flags      | pg       | LQL      |
|                                |            |                 |               |              |            |          |          |
| PCB-001<br>PCB-002             |            | 8.98<br>10.40   | 16.9<br>70.5  | 1.0<br>0.91  | м,Ј,В      |          | 50<br>50 |
| PCB-002                        |            | 10.40           | 69.9          | 0.78         |            |          | 50       |
| PCB-004                        |            | 10.66           | <12           | 4.9          | J,R        | 12       | 50       |
| PCB-010                        |            | NotFnd          | <2.9          | 2.9          | U          |          | 50       |
| PCB-009                        |            | NotFnd          | < 3.0         | 3.0          | U          |          | 50       |
| PCB-007<br>PCB-006             |            | 12.02<br>12.18  | 10.8<br><13   | 2.9<br>3.1   | J<br>J,R   | 13       | 50<br>50 |
| PCB-005                        |            | NotFnd          | <3.5          | 3.5          | U          | 13       | 50       |
| PCB-008                        |            | 12.44           | 47.1          | 2.8          | J,B        |          | 50       |
| PCB-014                        |            | NotFnd          | <2.8          | 2.8          | U          |          | 50       |
| PCB-011                        |            | 13.95           | 894           | 2.9          |            |          | 50       |
| PCB-012/013                    |            | 14.14           | <30<br><42    | 2.9<br>3.1   | J,R<br>J,R | 30<br>42 | 50<br>50 |
| PCB-015<br>PCB-019             |            | 14.34<br>12.65  | <42<br><3.9   | 1.2          | J,R        |          | 50       |
| PCB-018/030                    |            | 13.74           | 32.3          | 1.3          | J,R        | 3.5      | 50       |
| PCB-017                        |            | 13.99           | 18.1          | 1.5          | j          |          | 50       |
| PCB-027                        |            | 14.12           | <2.3          | 1.1          | J,R        | 2.3      | 50       |
| PCB-024                        |            | NotFnd          | <1.1          | 1.1          | U          |          | 50       |
| PCB-016                        |            | 14.28           | <15           | 1.7          | J,R        | 15       | 50       |
| PCB-032<br>PCB-034             |            | 14.56<br>NotFnd | 10.5<br><1.2  | 1.0          | J<br>U     |          | 50<br>50 |
| PCB-023                        |            | NotFnd          | <1.1          | 1.1          | U          |          | 50       |
| PCB-026/029                    |            | 15.53           | <12           | 1.1          | J,R        | 12       | 50       |
| PCB-025                        |            | 15.66           | <8.5          | 1.0          | J,R        | 8.5      | 50       |
| PCB-031                        |            | 15.85           | 62.7          | 1.0          |            |          | 50       |
| PCB-020/028<br>PCB-021/033     |            | 16.02           | 78.9<br><50   | 1.1          | 1.0        | 50       | 50<br>50 |
| PCB-021/033<br>PCB-022         |            | 16.16<br>16.40  | <50<br>32.4   | 1.1          | J,R<br>J   | 50       | 50       |
| PCB-036                        |            | 17.22           | 16.6          | 1.1          | j          |          | 50       |
| PCB-039                        |            | NotFnd          | <1.1          | 1.1          | U          |          | 50       |
| PCB-038                        |            | 17.85           | <1.2          | 1.2          | U          |          | 50       |
| PCB-035                        |            | 18.04           | 42.9          | 1.3          | J          |          | 50       |
| PCB-037                        |            | 18.27           | 67.7<br><0.49 | 1.5          | U          |          | 50<br>50 |
| PCB-054<br>PCB-050/053         |            | NotFnd<br>15.68 | 8.55          | 0.49<br>0.72 | J          |          | 50       |
| PCB-045/051                    |            | 16.10           | 71.3          | 0.75         | -          |          | 50       |
| PCB-046                        |            | 16.27           | <3.9          | 0.87         | J,R        | 3.9      | 50       |
| PCB-052                        |            | 17.00           | 270           | 0.76         |            |          | 50       |
| PCB-073                        |            | NotFnd          | <0.56         | 0.56         | U          |          | 50       |
| PCB-043<br>PCB-049/069         |            | 17.12<br>17.27  | <2.1<br>79.7  | 0.99<br>0.68 | J,R        | 2.1      | 50<br>50 |
| PCB-048                        |            | 17.43           | 18.6          | 0.77         | J          |          | 50       |
| PCB-044/047/065                |            | 17.57           | 506           | 0.72         | -          |          | 50       |
| PCB-059/062/075                |            | 17.74           | 10.6          | 0.59         | J          |          | 50       |
| PCB-042                        |            | 17.86           | <25           | 0.87         | J,R        | 25       | 50       |
| PCB-040/041/071                |            | 18.13           | 60.8          | 0.81         |            |          | 50       |
| PCB-064<br>PCB-072             |            | 18.25<br>NotFnd | 61.2<br><1.1  | 0.60<br>1.1  | U          |          | 50<br>50 |
| PCB-068                        |            | 18.81           | 50.1          | 1.0          | 3          |          | 50       |
| PCB-057                        |            | NotFnd          | <1.2          | 1.2          | U          |          | 50       |
| PCB-058                        |            | NotFnd          | <1.1          | 1.1          | U          |          | 50       |
| PCB-067                        |            | 19.26           | <2.9          | 1.0          | J,R        |          | 50       |
| PCB-063<br>PCB-061/070/074/076 |            | 19.41<br>19.60  | <4.8<br>419   | 1.1          | J,R        | 4.8      | 50<br>50 |
| PCB-061/070/074/076<br>PCB-066 |            | 19.60           | 144           | 1.1          |            |          | 50       |
| PCB-055                        |            | NotFnd          | <1.2          | 1.2          | U          |          | 50       |
| PCB-056                        |            | 20.15           | 62.5          | 1.2          |            |          | 50       |
| PCB-060                        |            | 20.28           | 38.0          | 1.2          | J          |          | 50       |
| PCB-080                        |            | NotFnd          | <1.0          | 1.0          | U          |          | 50       |
| PCB-079<br>PCB-078             |            | 21.26           | <6.5          | 1.1          |            | 6.5      | 50<br>50 |
| PCB-078<br>PCB-081             | 0.0003     | 21.63<br>NotFnd | <1.8<br><1.4  | 1.3<br>1.4   | J,R<br>U   | 1.8      | 50<br>50 |
| PCB-077                        | 0.0001     | 22.13           | 47.1          | 1.5          | j          |          | 50       |
| PCB-104                        |            | NotFnd          | < 0.63        | 0.63         | U          |          | 50       |
| PCB-096                        |            | 17.77           | 2.54          | 0.62         | М,Ј        |          | 50       |
| PCB-103                        |            | 18.74           | 2.39          | 1.9          | J          |          | 50       |
| PCB-094<br>PCB-095             |            | 18.89<br>19.13  | <2.2<br>475   | 2.2<br>2.1   | U          | 1.6      | 50<br>50 |
| PCB-093/098/100/102            |            | 19.30           | 17.3          | 2.0          | J          |          | 50       |

#### Sample Analysis Report

ENG-583-DFP-01 ALS Sample ID L2526958-11 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Sample E. Sabljic n/a --e-signature--01-Dec-2020 Split Ratio

Run Information Run 1 Filename Run Date 5-201130B15 30-Nov-20 19:54 Final Volume 25 ul Dilution Factor Analysis Units pg

|                                                        | TEF        | Ret.            | Conc.         | EDL          |          | EMPC |          |
|--------------------------------------------------------|------------|-----------------|---------------|--------------|----------|------|----------|
| Target Analytes                                        | (WHO 2005) | Time            | conc.<br>pg   |              | lags     | Pg   | LQL      |
|                                                        | /          |                 |               |              |          | - 5  |          |
| PCB-088/091<br>PCB-084                                 |            | 19.59<br>19.74  | 71.7<br>163   | 2.1<br>2.4   |          |      | 50<br>50 |
| PCB-084<br>PCB-089                                     |            | 19.74           | <5.2          | 2.4          | J,R      | 5.2  | 50       |
| PCB-121                                                |            | NotFnd          | <1.6          | 1.6          | U        |      | 50       |
| PCB-092                                                |            | 20.34           | 112           | 2.3          |          |      | 50       |
| PCB-090/101/113                                        |            | 20.64           | 657           | 1.9          |          |      | 50       |
| PCB-083/099                                            |            | 20.96           | 331           | 2.2          | М        |      | 50       |
| PCB-112                                                |            | 21.06           | <7.4          | 1.6          | M,J,R    | 7.4  | 50       |
| PCB-086/087/097/109/119/125<br>PCB-085/110/115/116/117 |            | 21.31<br>21.72  | 491<br>934    | 1.9<br>1.8   | M<br>M   |      | 50<br>50 |
| PCB-003/110/113/110/117                                |            | 21.93           | 87.8          | 2.9          | 1-1      |      | 50       |
| PCB-111                                                |            | NotFnd          | <1.6          | 1.6          | U        |      | 50       |
| PCB-120                                                |            | NotFnd          | <1.6          | 1.6          | U        |      | 50       |
| PCB-108/124                                            |            | 22.91           | 23.7          | 2.1          | J        |      | 50       |
| PCB-107                                                |            | 23.03           | 30.6          | 1.8          | M,J      |      | 50       |
| PCB-123                                                | 0.00003    | 23.08           | 10.1          | 2.4          | М,Ј      |      | 50       |
| PCB-106                                                | 0.00003    | NotFnd          | <2.1          | 2.1          | U        |      | 50       |
| PCB-118<br>PCB-122                                     | 0.00003    | 23.27<br>23.48  | 524<br><8.5   | 2.2<br>2.3   | J,R      | 8.5  | 50<br>50 |
| PCB-114                                                | 0.00003    | 23.58           | <11           | 2.2          | J,R      |      | 50       |
| PCB-105                                                | 0.00003    | 23.93           | 182           | 2.2          | -,       |      | 50       |
| PCB-127                                                |            | NotFnd          | <2.2          | 2.2          | U        |      | 50       |
| PCB-126                                                | 0.1        | 25.52           | <9.3          | 2.6          | M,J,R    | 9.3  | 50       |
| PCB-155                                                |            | 20.49           | <1.1          | 0.52         | J,R      |      | 50       |
| PCB-152                                                |            | 20.67           | < 0.55        | 0.50         |          | 0.55 | 50       |
| PCB-150                                                |            | 20.73           | 0.668         | 0.48         | J        |      | 50       |
| PCB-136<br>PCB-145                                     |            | 20.97<br>NotFnd | 61.2<br><0.51 | 0.51<br>0.51 | U        |      | 50<br>50 |
| PCB-143                                                |            | NotFnd          | <0.71         | 0.71         | U        |      | 50       |
| PCB-135/151                                            |            | 22.18           | 139           | 0.75         | Ü        |      | 50       |
| PCB-154                                                |            | NotFnd          | < 0.58        | 0.58         | U        |      | 50       |
| PCB-144                                                |            | 22.46           | 22.3          | 0.76         | j        |      | 50       |
| PCB-147/149                                            |            | 22.66           | 353           | 1.1          |          |      | 50       |
| PCB-134/143                                            |            | 22.80           | 31.5          | 1.3          | j        |      | 50       |
| PCB-139/140                                            |            | 22.97           | 10.6          | 1.1          | J        |      | 50       |
| PCB-131                                                |            | 23.10           | 8.92          | 1.4          | J        |      | 50       |
| PCB-142<br>PCB-132                                     |            | NotFnd<br>23.36 | <1.3<br>177   | 1.3<br>1.3   | U        |      | 50<br>50 |
| PCB-132<br>PCB-133                                     |            | 23.56           | 5.15          | 1.3          | j        |      | 50       |
| PCB-165                                                |            | 23.72           | < 0.96        | 0.96         | U        |      | 50       |
| PCB-146                                                |            | 23.87           | <46           | 1.1          | J,R      |      | 50       |
| PCB-161                                                |            | NotFnd          | < 0.92        | 0.92         | U        |      | 50       |
| PCB-153/168                                            |            | 24.19           | 297           | 0.95         |          |      | 50       |
| PCB-141                                                |            | 24.32           | 75.5          | 1.2          |          |      | 50       |
| PCB-130                                                |            | 24.54           | <24           | 1.5          |          | 24   | 50       |
| PCB-137/164                                            |            | 24.71           | 48.9<br>454   | 1.1<br>1.2   | М,Ј      |      | 50<br>50 |
| PCB-129/138/163<br>PCB-160                             |            | 24.88<br>NotFnd | 454<br><0.93  | 0.93         | U        |      | 50<br>50 |
| PCB-158                                                |            | 25.09           | <42           | 0.84         | J,R      | 42   | 50       |
| PCB-128/166                                            |            | 25.57           | 63.2          | 1.1          | -//\     |      | 50       |
| PCB-159                                                |            | 26.00           | <2.0          | 0.99         | J,R      | 2.0  | 50       |
| PCB-162                                                |            | NotFnd          | <1.0          | 1.0          | U        |      | 50       |
| PCB-167                                                | 0.00003    | 26.40           | 15.2          | 0.99         | J        |      | 50       |
| PCB-156/157                                            | 0.00003    | 27.02           | 37.9          | 1.4          | J        |      | 100      |
| PCB-169                                                | 0.03       | NotFnd          | <1.1          | 1.1          | U        |      | 50       |
| PCB-188<br>PCB-179                                     |            | NotFnd<br>23.72 | <0.55<br>25.3 | 0.55<br>0.50 | U<br>J   |      | 50<br>50 |
| PCB-179<br>PCB-184                                     |            | 23.72           | 1.70          | 0.50         | j        |      | 50       |
| PCB-176                                                |            | 24.18           | 8.24          | 0.51         | j        |      | 50       |
| PCB-186                                                |            | NotFnd          | < 0.52        | 0.52         | Ú        |      | 50       |
| PCB-178                                                |            | 25.07           | 12.5          | 0.75         | J        |      | 50       |
| PCB-175                                                |            | 25.39           | 3.57          | 0.75         | J        |      | 50       |
| PCB-187                                                |            | 25.53           | 73.7          | 0.65         |          |      | 50       |
| PCB-182                                                |            | NotFnd          | < 0.71        | 0.71         | U        |      | 50       |
| PCB-183                                                |            | 25.85           | 35.0          | 0.73         | M,J      |      | 50       |
| PCB-185                                                |            | 25.94           | 5.25          | 0.74         | M,J      |      | 50       |
| PCB-174<br>PCB-177                                     |            | 26.00           | 50.3<br>28.2  | 0.77<br>0.83 | M<br>1   |      | 50<br>50 |
| PCB-177<br>PCB-181                                     |            | 26.25<br>26.45  | 28.2<br><1.0  | 0.83         | J<br>1.R | 1.0  | 50<br>50 |
| PCB-181<br>PCB-171/173                                 |            | 26.45           | 17.0          | 0.77         | J,K      |      | 50       |
| PCB-172                                                |            | 27.36           | <8.6          | 0.86         |          | 8.6  | 50       |

#### Sample Analysis Report

 Sample Name
 ENG-583-DFP-01

 ALS Sample ID
 L2526958-11

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run 1

 Filename
 5-201130B15

 Run Date
 30-Nov-20 19:54

 Final Volume
 25
 ul

 Dilution Factor
 1

 Analysis Units
 pg

|                                | TEF          | Ret.   | Conc.  | EDL    |      | EMPC |     |
|--------------------------------|--------------|--------|--------|--------|------|------|-----|
| Target Analytes                | (WHO 2005)   | Time   | pg     | pg F   | lags | pg   | LQL |
| PCB-192                        |              | NotFnd | <0.68  | 0.68   | U    |      | 50  |
| PCB-180/193                    |              | 27.68  | 115    | 0.70   | Ü    |      | 50  |
| PCB-180/193                    |              | 27.88  | <3.3   | 0.64   | 1 P  | 3.3  | 50  |
| PCB-191                        |              | 28.38  | 50.6   | 0.94   | 3,10 | 5.5  | 50  |
| PCB-170<br>PCB-190             |              | 28.38  | 11.2   | 0.59   | j    |      | 50  |
| PCB-190                        | 0.00003      | 29.96  | <1.9   | 0.60   |      | 1.9  | 50  |
|                                | 0.00003      |        |        |        |      | 1.9  |     |
| PCB-202                        |              | 26.27  | 18.5   | 0.80   | J    |      | 50  |
| PCB-201                        |              | 26.74  | 5.88   | 0.70   | J    |      | 50  |
| PCB-204                        |              | NotFnd | < 0.71 | 0.71   | U    |      | 50  |
| PCB-197                        |              | 27.19  | <1.0   | 0.67   |      | 1.0  | 50  |
| PCB-200                        |              | 27.30  | 6.09   | 0.73   | J    |      | 50  |
| PCB-198/199                    |              | 28.70  | 47.0   | 1.0    | J    |      | 50  |
| PCB-196                        |              | 29.03  | 15.1   | 1.0    | J    |      | 50  |
| PCB-203                        |              | 29.13  | 30.5   | 0.94   | J    |      | 50  |
| PCB-195                        |              | 29.86  | 8.84   | 0.82   | J    |      | 50  |
| PCB-194                        |              | 31.06  | 28.8   | 0.77   | J    |      | 50  |
| PCB-205                        |              | 31.34  | <1.6   | 0.61   |      | 1.6  | 50  |
| PCB-208                        |              | 29.68  | 21.9   | 1.5    | J    |      | 50  |
| PCB-207                        |              | 30.15  | 8.07   | 1.5    | J    |      | 50  |
| PCB-206                        |              | 32.40  | 53.4   | 2.2    |      |      | 50  |
| PCB-209                        |              | 33.54  | 89.4   | 3.7    | В    |      | 50  |
|                                |              |        |        |        |      |      |     |
| Extraction Standards           | pg           | Time   | % Rec  | Limits |      |      |     |
| 13C12-PCB-001                  | 2000         | 8.95   | 67     | 5-145  |      |      |     |
| 13C12-PCB-001                  | 2000         | 10.51  | 60     | 5-145  |      |      |     |
|                                |              |        |        |        |      |      |     |
| 13C12-PCB-004                  | 2000         | 10.65  | 69     | 5-145  |      |      |     |
| 13C12-PCB-015                  | 2000         | 14.32  | 64     | 5-145  |      |      |     |
| 13C12-PCB-019                  | 2000         | 12.62  | 79     | 5-145  |      |      |     |
| 13C12-PCB-037                  | 2000         | 18.26  | 74     | 5-145  |      |      |     |
| 13C12-PCB-054                  | 2000         | 14.47  | 84     | 5-145  |      |      |     |
| 13C12-PCB-081                  | 2000         | 21.82  |        | 10-145 |      |      |     |
| 13C12-PCB-077                  | 2000         | 22.12  |        | 10-145 |      |      |     |
| 13C12-PCB-104                  | 2000         | 17.51  |        | 10-145 |      |      |     |
| 13C12-PCB-123                  | 2000         | 23.08  |        | 10-145 |      |      |     |
| 13C12-PCB-118                  | 2000         | 23.26  |        | 10-145 |      |      |     |
| 13C12-PCB-114                  | 2000         | 23.56  |        | 10-145 |      |      |     |
| 13C12-PCB-105                  | 2000         | 23.91  |        | 10-145 |      |      |     |
| 13C12-PCB-126                  | 2000         | 25.51  |        | 10-145 |      |      |     |
| 13C12-PCB-155                  | 2000         | 20.48  |        | 10-145 |      |      |     |
| 13C12-PCB-167                  | 2000         | 26.39  |        | 10-145 |      |      |     |
| 13C12-PCB-156/157              | 4000         | 27.02  |        | 10-145 |      |      |     |
| 13C12-PCB-169                  | 2000         | 28.69  |        | 10-145 |      |      |     |
| 13C12-PCB-188                  | 2000         | 23.48  |        | 10-145 |      |      |     |
| 13C12-PCB-189                  | 2000         | 29.95  |        | 10-145 |      |      |     |
| 13C12-PCB-202                  | 2000         | 26.26  | 81     | 10-145 |      |      |     |
| 13C12-PCB-205                  | 2000         | 31.33  | 111    | 10-145 |      |      |     |
| 13C12-PCB-208                  | 2000         | 29.67  | 82     | 10-145 |      |      |     |
| 13C12-PCB-206                  | 2000         | 32.39  | 99     | 10-145 |      |      |     |
| 13C12-PCB-209                  | 2000         | 33.51  | 70     | 10-145 |      |      |     |
| Cleanup Standards              |              |        |        |        |      |      |     |
|                                |              |        |        |        |      |      |     |
| 13C12-PCB-028                  | 2000         | 16.00  |        | 5-145  |      |      |     |
|                                | 0000         |        |        |        |      |      |     |
| 13C12-PCB-111<br>13C12-PCB-178 | 2000<br>2000 | 22.02  | 84     | 10-145 |      |      |     |

#### **ALS Life Sciences Sample Analysis Report** ENG-583-DFP-01 Sampling Date ALS Sample ID L2526958-11 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Split Ratio 01-Dec-2020 Sample Matrix Swab **Run Information** Run 1 Filename 5-201130B15 Run Date 30-Nov-20 19:54 Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 157 0.78 200 Total DiCB 1050 400 2.8 Total TriCB 400 Total TetraCB Total PentaCB 1890 0.49 800 0.62 800 4160 Total HexaCB 1920 Total HeptaCB 452 0.45 400 Total OctaCB 163 400 0.61 Total NonaCB 83.4 1.5 200 DecaCB 89.4 3.7 200 Total PCB 10400 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.0278 Mid Point PCB TEO 0.975 Upper Bound PCB TEQ 0.992 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

U

В

EMPC

#### Sample Analysis Report

ENG-558-DFP-01 ALS Sample ID L2526958-12 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: E. Sabljic --e-signature--01-Dec-2020 Sample Size Percent Moisture Sample n/a Split Ratio

**Run Information** Run 1 Filename Run Date 5-201130B16 30-Nov-20 20:36 Final Volume 25 ul Dilution Factor pg

HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                     | TEF        | Ret.             | Conc.        | EDL        |          | EMPC |          |
|---------------------|------------|------------------|--------------|------------|----------|------|----------|
| Target Analytes     | (WHO 2005) | Time             | pg           | pg Fla     |          | pg   | LQL      |
|                     | /          |                  |              |            |          |      |          |
| PCB-001             |            | NotFnd           | <4.7         | 4.7        | U        |      | 50       |
| PCB-002             |            | 10.51            | 33.6         | 1.7        | J        | 22   | 50       |
| PCB-003             |            | 10.62            | <22<br><5.2  | 0.82       | J,R      | 22   | 50       |
| PCB-004<br>PCB-010  |            | NotFnd<br>NotFnd | <5.2<br><3.2 | 5.2<br>3.2 | U        |      | 50<br>50 |
| PCB-010<br>PCB-009  |            | NotFnd<br>NotFnd | <3.2<br><3.2 | 3.2        | U        |      | 50<br>50 |
| PCB-009             |            | NotFnd           | <3.1         | 3.1        | U        |      | 50       |
| PCB-007             |            | NotFnd           | <3.3         | 3.3        | U        |      | 50       |
| PCB-005             |            | NotFnd           | <3.7         | 3.7        | U        |      | 50       |
| PCB-008             |            | 12.51            | 9.24         | 3.0        | J,B      |      | 50       |
| PCB-014             |            | NotFnd           | <2.4         | 2.4        | Ū        |      | 50       |
| PCB-011             |            | 13.98            | 1400         | 2.4        |          |      | 50       |
| PCB-012/013         |            | NotFnd           | <2.4         | 2.4        | U        |      | 50       |
| PCB-015             |            | 14.37            | <5.5         | 2.6        | J,R      | 5.5  | 50       |
| PCB-019             |            | NotFnd           | <1.2         | 1.2        | U        |      | 50       |
| PCB-018/030         |            | 13.78            | < 6.9        | 1.1        | J,R      | 6.9  | 50       |
| PCB-017             |            | 14.03            | 3.60         | 1.2        | J        |      | 50       |
| PCB-027             |            | NotFnd           | < 0.93       | 0.93       | U        |      | 50       |
| PCB-024             |            | NotFnd           | < 0.94       | 0.94       | U        |      | 50       |
| PCB-016             |            | 14.32            | <3.2         | 1.4        | J,R      | 3.2  | 50       |
| PCB-032             |            | 14.59            | 3.07         | 0.86       | J        |      | 50       |
| PCB-034             |            | NotFnd           | <1.4         | 1.4        | U        |      | 50       |
| PCB-023             |            | NotFnd           | <1.3         | 1.3        | U        |      | 50       |
| PCB-026/029         |            | 15.57            | 3.39         | 1.3        | J        |      | 50       |
| PCB-025             |            | 15.69            | <1.2         | 1.2        | U        | 0.84 | 50       |
| PCB-031             |            | 15.87            | 11.7         | 1.2        | J,B      |      | 50       |
| PCB-020/028         |            | 16.04            | 13.5         | 1.3        | J        |      | 50       |
| PCB-021/033         |            | 16.17            | <8.0         | 1.3        | J,R      | 8.0  | 50       |
| PCB-022             |            | 16.41            | 5.33         | 1.3        | J        |      | 50       |
| PCB-036             |            | NotFnd           | <1.3         | 1.3        | U        |      | 50       |
| PCB-039             |            | NotFnd           | <1.3         | 1.3        | U        |      | 50       |
| PCB-038             |            | NotFnd           | <1.4         | 1.4        | U        |      | 50       |
| PCB-035<br>PCB-037  |            | 18.05<br>18.28   | 12.1<br>6.25 | 1.5<br>1.8 | M,J<br>J |      | 50<br>50 |
| PCB-054             |            | NotFnd           | < 0.56       | 0.56       | U        |      | 50       |
| PCB-050/053         |            | 15.71            | <1.1         | 0.89       | J,R      | 1.1  | 50       |
| PCB-045/051         |            | 16.12            | <4.4         | 0.93       | J,R      | 4.4  | 50       |
| PCB-045/031         |            | NotFnd           | <1.1         | 1.1        | J,K<br>U | 4.4  | 50       |
| PCB-052             |            | 17.02            | 26.9         | 0.94       | J,B      |      | 50       |
| PCB-073             |            | NotFnd           | < 0.69       | 0.69       | U        |      | 50       |
| PCB-043             |            | NotFnd           | <1.2         | 1.2        | U        |      | 50       |
| PCB-049/069         |            | 17.29            | 7.20         | 0.85       | j        |      | 50       |
| PCB-048             |            | 17.45            | 1.77         | 0.95       | j        |      | 50       |
| PCB-044/047/065     |            | 17.58            | 28.0         | 0.89       | J,B      |      | 50       |
| PCB-059/062/075     |            | 17.75            | < 0.73       | 0.73       | U        | 0.47 | 50       |
| PCB-042             |            | 17.88            | <3.0         | 1.1        | J,R      |      | 50       |
| PCB-040/041/071     |            | 18.14            | <6.8         | 1.0        | J,R      | 6.8  | 50       |
| PCB-064             |            | 18.26            | <5.7         | 0.74       | J,R      | 5.7  | 50       |
| PCB-072             |            | NotFnd           | < 0.77       | 0.77       | U        |      | 50       |
| PCB-068             |            | 18.81            | 4.58         | 0.72       | J        |      | 50       |
| PCB-057             |            | NotFnd           | < 0.82       | 0.82       | U        |      | 50       |
| PCB-058             |            | NotFnd           | < 0.75       | 0.75       | U        |      | 50       |
| PCB-067             |            | NotFnd           | < 0.71       | 0.71       | U        |      | 50       |
| PCB-063             |            | NotFnd           | < 0.76       | 0.76       | U        |      | 50       |
| PCB-061/070/074/076 |            | 19.61            | 36.2         | 0.79       | J        |      | 50       |
| PCB-066             |            | 19.79            | <12          | 0.77       | J,R      | 12   | 50       |
| PCB-055             |            | NotFnd           | <0.83        | 0.83       | U        |      | 50       |
| PCB-056             |            | 20.16            | <9.0         | 0.85       | J,R      | 9.0  | 50       |
| PCB-060             |            | 20.29            | 3.81         | 0.83       | J        |      | 50       |
| PCB-080             |            | NotFnd           | < 0.71       | 0.71       | U        |      | 50       |
| PCB-079             |            | 21.30            | <0.76        | 0.76       | U        | 0.68 | 50       |
| PCB-078             |            | NotFnd           | < 0.89       | 0.89       | U        |      | 50       |
| PCB-081             | 0.0003     | NotFnd           | < 0.94       | 0.94       | U        |      | 50       |
| PCB-077             | 0.0001     | 22.14            | < 5.0        | 1.0        | J,R      | 5.0  | 50       |
| PCB-104             |            | NotFnd           | <0.59        | 0.59       | U        |      | 50       |
| PCB-096             |            | NotFnd           | <0.57        | 0.57       | U        |      | 50       |
| PCB-103             |            | NotFnd           | <2.1         | 2.1        | U        |      | 50       |
| PCB-094             |            | NotFnd           | <2.4         | 2.4        | U        |      | 50       |
| PCB-095             |            | 19.14            | 37.7         | 2.4        | J        |      | 50       |
| PCB-093/098/100/102 |            | NotFnd           | <2.3         | 2.3        | U        |      | 50       |

#### **Sample Analysis Report**

 Sample Name
 ENG-558-DFP-01

 ALS Sample ID
 L2526958-12

 Analysis Method
 EPA 1668C

 Analysis Type
 Sample

 Sample Matrix
 Swab

Sampling Date 4-Nov-20 Extraction Date 25-Nov-20

 Sample Size
 1
 Sample

 Percent Moisture
 n/a

 Split Ratio
 2

Approved: E. Sabljic --e-signature--01-Dec-2020

 Run Information
 Run I

 Filename
 5-2011 J SIG

 Run Date
 30-Nov - 20:36

 Final Volume
 25
 u

 Dilution Factor
 1
 y

 Analysis Units
 pg
 L

|                             | TEF               | Pat              | Co            | EDL         |          | ЕМРС       |          |
|-----------------------------|-------------------|------------------|---------------|-------------|----------|------------|----------|
| Target Analytes             | TEF<br>(WHO 2005) | Ret.<br>Time     | Conc.<br>pg   | EDL<br>pg F | lags     | EMPC<br>pg | LQL      |
|                             | 2000)             |                  |               |             |          |            |          |
| PCB-088/091                 |                   | 19.60            | 6.44          | 2.4         | J        |            | 50<br>50 |
| PCB-084<br>PCB-089          |                   | 19.74<br>NotFnd  | 15.5<br><2.6  | 2.7<br>2.6  | J<br>U   |            | 50<br>50 |
| PCB-121                     |                   | NotFnd           | <2.6<br><1.8  | 1.8         | U        |            | 50       |
| PCB-092                     |                   | 20.35            | 10.4          | 2.5         | j        |            | 50       |
| PCB-090/101/113             |                   | 20.65            | 57.6          | 2.1         | _        |            | 50       |
| PCB-083/099                 |                   | 20.96            | 31.1          | 2.5         | M,J      |            | 50       |
| PCB-112                     |                   | 21.06            | <2.4          | 1.8         |          | 2.4        | 50       |
| PCB-086/087/097/109/119/125 |                   | 21.31            | 50.3          | 2.2         | М        |            | 50       |
| PCB-085/110/115/116/117     |                   | 21.72            | 123           | 2.0         | M        |            | 50       |
| PCB-082<br>PCB-111          |                   | 21.92<br>NotFnd  | <6.9<br><1.8  | 3.2<br>1.8  | J,R<br>U |            | 50<br>50 |
| PCB-111<br>PCB-120          |                   | 22.27            | <1.8<br>29.5  | 1.8         | J        |            | 50       |
| PCB-120                     |                   | 22.90            | <4.4          | 4.4         | M,U      |            | 50       |
| PCB-107                     |                   | 23.04            | <3.8          | 3.8         | M,U      |            | 50       |
| PCB-123                     | 0.00003           | NotFnd           | <4.9          | 4.9         | U        |            | 50       |
| PCB-106                     |                   | NotFnd           | <4.5          | 4.5         | U        |            | 50       |
| PCB-118                     | 0.00003           | 23.26            | <69           | 4.5         | R        |            | 50       |
| PCB-122                     |                   | NotFnd           | <4.9          | 4.9         | U        |            | 50       |
| PCB-114                     | 0.00003           | NotFnd           | <4.6          | 4.6         | U        |            | 50       |
| PCB-105                     | 0.00003           | 23.91            | 32.7          | 5.0         | J        |            | 50       |
| PCB-127<br>PCB-126          | 0.1               | NotFnd           | <4.6          | 4.6         | U        |            | 50       |
| PCB-126<br>PCB-155          | 0.1               | NotFnd<br>20.51  | <5.8<br><0.78 | 5.8<br>0.78 | U        |            | 50<br>50 |
| PCB-153                     |                   | NotFnd           | <0.52         | 0.52        | U        |            | 50       |
| PCB-150                     |                   | NotFnd           | < 0.50        | 0.50        | U        |            | 50       |
| PCB-136                     |                   | 20.97            | 8.52          | 0.54        | M,J      |            | 50       |
| PCB-145                     |                   | NotFnd           | < 0.54        | 0.54        | U        |            | 50       |
| PCB-148                     |                   | NotFnd           | < 0.76        | 0.76        | U        |            | 50       |
| PCB-135/151                 |                   | 22.17            | 19.6          | 0.79        | M,J      |            | 50       |
| PCB-154                     |                   | NotFnd           | < 0.62        | 0.62        | U        |            | 50       |
| PCB-144                     |                   | 22.48            | 3.91          | 0.81        | J        |            | 50       |
| PCB-147/149                 |                   | 22.67            | 55.3          | 1.6         |          |            | 50       |
| PCB-134/143                 |                   | 22.80            | 5.19          | 2.0         | J        |            | 50       |
| PCB-139/140<br>PCB-131      |                   | NotFnd<br>NotFnd | <1.6<br><2.1  | 1.6<br>2.1  | U        |            | 50<br>50 |
| PCB-131<br>PCB-142          |                   | NotFnd           | <2.0          | 2.0         | U        |            | 50       |
| PCB-132                     |                   | 23.36            | 32.0          | 1.9         | j        |            | 50       |
| PCB-133                     |                   | NotFnd           | <1.9          | 1.9         | U        |            | 50       |
| PCB-165                     |                   | NotFnd           | <1.4          | 1.4         | U        |            | 50       |
| PCB-146                     |                   | 23.87            | 10.6          | 1.6         | J        |            | 50       |
| PCB-161                     |                   | NotFnd           | <1.4          | 1.4         | U        |            | 50       |
| PCB-153/168                 |                   | 24.19            | 61.4          | 1.4         |          |            | 50       |
| PCB-141                     |                   | 24.32            | 17.9          | 1.9         | J        |            | 50       |
| PCB-130                     |                   | 24.53            | 6.43          | 2.2         | J        |            | 50       |
| PCB-137/164                 |                   | 24.71            | 13.6          | 1.6         | M,J      |            | 50       |
| PCB-129/138/163<br>PCB-160  |                   | 24.88<br>NotFnd  | 117<br><1.4   | 1.9<br>1.4  | U        |            | 50<br>50 |
| PCB-158                     |                   | 25.07            | 11.4          | 1.4         | J        |            | 50       |
| PCB-138                     |                   | 25.57            | 17.9          | 1.7         | j        |            | 50       |
| PCB-159                     |                   | 25.97            | 5.39          | 1.5         | j        |            | 50       |
| PCB-162                     |                   | NotFnd           | <1.5          | 1.5         | U        |            | 50       |
| PCB-167                     | 0.00003           | 26.40            | <5.2          | 1.4         | J,R      | 5.2        | 50       |
| PCB-156/157                 | 0.00003           | 27.02            | 18.0          | 1.9         | J        |            | 100      |
| PCB-169                     | 0.03              | NotFnd           | <1.5          | 1.5         | U        |            | 50       |
| PCB-188                     |                   | NotFnd           | <1.3          | 1.3         | U        |            | 50       |
| PCB-179                     |                   | 23.72            | 6.41          | 1.0         | J        |            | 50       |
| PCB-184                     |                   | 23.95            | < 0.94        | 0.94        | U        |            | 50       |
| PCB-176                     |                   | 24.16            | 2.20          | 1.1         | J        |            | 50       |
| PCB-186                     |                   | NotFnd           | <1.1          | 1.1         | U        |            | 50       |
| PCB-178<br>PCB-175          |                   | 25.07            | 3.06          | 1.6         | J<br>U   |            | 50<br>50 |
| PCB-175<br>PCB-187          |                   | NotFnd<br>25.53  | <1.6<br>22.3  | 1.6<br>1.4  |          |            | 50       |
| PCB-187<br>PCB-182          |                   | NotFnd           | <1.5          | 1.5         | J,B<br>U |            | 50       |
| PCB-183                     |                   | 25.85            | <113          | 1.5         |          | 11         | 50       |
| PCB-185                     |                   | 25.93            | <1.8          | 1.5         |          | 1.8        | 50       |
| PCB-174                     |                   | 26.00            | 21.7          | 1.6         | M,J      |            | 50       |
| PCB-177                     |                   | 26.25            | 11.4          | 1.7         | ,,,      |            | 50       |
| PCB-181                     |                   | NotFnd           | <1.6          | 1.6         | U        |            | 50       |
| PCB-171/173                 |                   | 26.56            | <4.7          | 1.8         | J,R      | 4.7        | 50       |
| PCB-172                     |                   | 27.36            | <2.6          | 1.8         | J,R      | 2.6        | 50       |

#### Sample Analysis Report

ENG-558-DFP-01 ALS Sample ID L2526958-12 Analysis Method EPA 1668C Analysis Type Sample Swab Sample Matrix

Sampling Date Extraction Date 25-Nov-20

Approved: Sample Size Percent Moisture Sample E. Sabljic n/a --e-signature--01-Dec-2020 Split Ratio

Run Information Run 1 Filename Run Date 5-201130B16 30-Nov-20 20:36 Final Volume 25 ul Dilution Factor Analysis Units pg

|                        | TEF        | Ret.   | Conc. | EDL    |       | EMPC   |     |
|------------------------|------------|--------|-------|--------|-------|--------|-----|
| Target Analytes        | (WHO 2005) | Time   | pg    | pg     | Flags | pg     | LQL |
| PCB-192                |            | NotFnd | <1.4  | 1.4    |       | J      | 50  |
| PCB-192                |            | 27.73  | 204   | 1.5    | ,     |        | 50  |
| PCB-180/193<br>PCB-191 |            | NotFnd | <1.3  | 1.3    |       | J      | 50  |
|                        |            |        |       |        |       |        |     |
| PCB-170                |            | 28.37  | 34.0  | 1.9    |       | )      | 50  |
| PCB-190                | 0.00003    | 28.65  | 5.83  | 1.2    |       | ]      | 50  |
| PCB-189                | 0.00003    | 29.96  | <1.3  | 1.3    |       | J 0.66 | 50  |
| PCB-202                |            | 26.27  | <1.8  | 1.4    | J,I   |        | 50  |
| PCB-201                |            | 26.75  | <1.1  | 1.1    | М,    |        | 50  |
| PCB-204                |            | NotFnd | <1.1  | 1.1    |       | J      | 50  |
| PCB-197                |            | NotFnd | <1.0  | 1.0    |       | J      | 50  |
| PCB-200                |            | NotFnd | <1.1  | 1.1    |       | J      | 50  |
| PCB-198/199            |            | 28.70  | 16.9  | 1.6    |       | J      | 50  |
| PCB-196                |            | 29.03  | 6.80  | 1.6    |       | J      | 50  |
| PCB-203                |            | 29.12  | <8.4  | 1.5    | ا, ا  | R 8.4  | 50  |
| PCB-195                |            | 29.85  | 4.78  | 1.5    |       | J      | 50  |
| PCB-194                |            | 31.06  | 17.9  | 1.4    |       | J      | 50  |
| PCB-205                |            | NotFnd | <1.1  | 1.1    |       |        | 50  |
| PCB-208                |            | 29.69  | <5.3  | 2.6    | J,I   |        | 50  |
| PCB-207                |            | 30.15  | 4.40  | 1.9    | М,    |        | 50  |
| PCB-206                |            | 32.37  | <21   | 2.1    | J,I   |        | 50  |
| PCB-209                |            | 33.53  | 218   | 9.4    |       | В      | 50  |
| . 35 209               |            | 33.33  | 210   | 3.4    |       | -      | 30  |
| Extraction Standards   | pg         | Time   | % Rec | Limits |       |        |     |
|                        |            |        |       |        |       |        |     |
| 13C12-PCB-001          | 2000       | 8.97   | 40    | 5-145  | R     |        |     |
| 13C12-PCB-003          | 2000       | 10.62  | 62    | 5-145  | R     |        |     |
| 13C12-PCB-004          | 2000       | 10.75  | 64    | 5-145  |       |        |     |
| 13C12-PCB-015          | 2000       | 14.36  | 58    | 5-145  |       |        |     |
| 13C12-PCB-019          | 2000       | 12.69  | 65    | 5-145  |       |        |     |
| 13C12-PCB-037          | 2000       | 18.27  | 65    | 5-145  |       |        |     |
| 13C12-PCB-054          | 2000       | 14.51  | 76    |        |       |        |     |
| 13C12-PCB-081          | 2000       | 21.81  |       | 10-145 |       |        |     |
| 13C12-PCB-077          | 2000       | 22.11  |       | 10-145 |       |        |     |
|                        |            |        |       |        |       |        |     |
| 13C12-PCB-104          | 2000       | 17.52  |       | 10-145 |       |        |     |
| 13C12-PCB-123          | 2000       | 23.08  |       | 10-145 |       |        |     |
| 13C12-PCB-118          | 2000       | 23.25  |       | 10-145 |       |        |     |
| 13C12-PCB-114          | 2000       | 23.55  |       | 10-145 |       |        |     |
| 13C12-PCB-105          | 2000       | 23.91  |       | 10-145 |       |        |     |
| 13C12-PCB-126          | 2000       | 25.51  |       | 10-145 |       |        |     |
| 13C12-PCB-155          | 2000       | 20.49  |       | 10-145 |       |        |     |
| 13C12-PCB-167          | 2000       | 26.38  |       | 10-145 |       |        |     |
| 13C12-PCB-156/157      | 4000       | 27.02  |       | 10-145 |       |        |     |
| 13C12-PCB-169          | 2000       | 28.69  |       | 10-145 |       |        |     |
| 13C12-PCB-188          | 2000       | 23.48  | 58    | 10-145 |       |        |     |
| 13C12-PCB-189          | 2000       | 29.95  | 77    | 10-145 |       |        |     |
| 13C12-PCB-202          | 2000       | 26.26  |       | 10-145 |       |        |     |
| 13C12-PCB-205          | 2000       | 31.33  |       | 10-145 |       |        |     |
| 13C12-PCB-208          | 2000       | 29.67  |       | 10-145 |       |        |     |
| 13C12-PCB-206          | 2000       | 32.39  |       | 10-145 |       |        |     |
| 13C12-PCB-209          | 2000       | 33.51  |       | 10-145 |       |        |     |
| Cleanup Standards      |            |        |       |        |       |        |     |
|                        |            |        |       |        |       |        |     |
| 13C12-PCB-028          | 2000       | 16.03  | 72    | 5-145  |       |        |     |
| 13C12-PCB-111          | 2000       | 22.02  |       | 10-145 |       |        |     |
| 13C12-PCB-178          | 2000       | 25.05  |       | 10-145 |       |        |     |
| 13C12   CD-176         | 2000       | 25.05  | - 00  | 10 1-3 |       |        |     |

#### **ALS Life Sciences Sample Analysis Report** ENG-558-DFP-01 Sampling Date ALS Sample ID L2526958-12 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Sample E. Sabljic Analysis Type Sample Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Swab **Run Information** Run 1 Filename 5-201130B16 Run Date 30-Nov-20 20:36 Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 55.6 0.82 200 Total DiCB 1410 400 2.4 Total TriCB 0.86 400 Total TetraCB Total PentaCB 155 473 0.56 0.57 800 800 Total HexaCB Total HeptaCB 331 0.94 400 Total OctaCB 56.6 1.0 400 Total NonaCB 30.7 200 1.9 DecaCB 218 9.4 200 Total PCB 3220 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00152 Mid Point PCB TEO 0.317 Upper Bound PCB TEQ 0.630 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency LQL M Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that this target was detected in the blank at greater than 10% of the sample concentration.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

U

В

EMPC

#### **Laboratory Method Blank Analysis Report**

Split Ratio

Method Blank ALS Sample ID WG3440853-1 Analysis Method EPA 1668C Analysis Type Blank Sample Matrix Swab

Sampling Date 25-Nov-20 Extraction Date Sample Size Percent Moisture

n/a

Blank

Approved: E. Sabljic --e-signature--01-Dec-2020

**Run Information** Run 1 Filename Run Date 5-201130B21 01-Dec-20 00:17 Final Volume 25 Dilution Factor pg

HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                                | TEF        | Ret.                       | Conc.         | EDL          | E          | ЕМРС        |          |
|--------------------------------|------------|----------------------------|---------------|--------------|------------|-------------|----------|
| Target Analytes                | (WHO 2005) | Time                       | pg            | pg F         |            | pg          | LQL      |
|                                | ŕ          |                            |               |              |            |             |          |
| PCB-001<br>PCB-002             |            | 8.94<br>10.37              | 2.60<br><3.4  | 0.62<br>0.72 | M,J<br>J,R | 3.4         | 50<br>50 |
| PCB-002                        |            | 10.37                      | <4.6          | 0.76         |            | 4.6         | 50       |
| PCB-004                        |            | NotFnd                     | <4.3          | 4.3          | U          |             | 50       |
| PCB-010                        |            | NotFnd                     | <2.8          | 2.8          | U          |             | 50       |
| PCB-009                        |            | NotFnd                     | <2.8          | 2.8          | U          |             | 50       |
| PCB-007                        |            | NotFnd                     | <2.8          | 2.8          | U          |             | 50       |
| PCB-006<br>PCB-005             |            | NotFnd<br>NotFnd           | <2.9<br><3.3  | 2.9<br>3.3   | U<br>U     |             | 50<br>50 |
| PCB-003<br>PCB-008             |            | 12.44                      | < 3.3<br>5.96 | 2.6          | j          |             | 50       |
| PCB-014                        |            | NotFnd                     | <2.2          | 2.2          | U          |             | 50       |
| PCB-011                        |            | 13.97                      | <27           | 2.2          |            | 27          | 50       |
| PCB-012/013                    |            | NotFnd                     | <2.2          | 2.2          | U          |             | 50       |
| PCB-015                        |            | NotFnd                     | <2.6          | 2.6          | U          |             | 50       |
| PCB-019                        |            | NotFnd                     | <1.3          | 1.3          | U          |             | 50       |
| PCB-018/030                    |            | 13.73                      | 3.27          | 1.3          | M,J        |             | 50       |
| PCB-017                        |            | 13.99                      | <2.0          | 1.6          |            | 2.0         | 50       |
| PCB-027<br>PCB-024             |            | NotFnd<br>NotFnd           | <1.2<br><1.2  | 1.2          | U<br>U     |             | 50<br>50 |
| PCB-024<br>PCB-016             |            | 14.27                      | <1.2<br><1.9  | 1.9          |            | 1.1         | 50       |
| PCB-032                        |            | 14.56                      | <1.2          | 1.1          |            | 1.2         | 50       |
| PCB-034                        |            | NotFnd                     | <1.7          | 1.7          | U          |             | 50       |
| PCB-023                        |            | NotFnd                     | <1.6          | 1.6          | U          |             | 50       |
| PCB-026/029                    |            | 15.55                      | <1.6          | 1.6          | U          | 0.96        | 50       |
| PCB-025                        |            | NotFnd                     | <1.4          | 1.4          | U          |             | 50       |
| PCB-031                        |            | 15.85                      | 5.93          | 1.5          | J          |             | 50       |
| PCB-020/028                    |            | NotFnd                     | <1.6          | 1.6          | U          | 2 2         | 50       |
| PCB-021/033<br>PCB-022         |            | 16.16<br>16.41             | <3.3<br><1.7  | 1.6<br>1.7   |            | 3.3<br>1.6  | 50<br>50 |
| PCB-022<br>PCB-036             |            | NotFnd                     | <1.7          | 1.6          | M,U        | 1.0         | 50       |
| PCB-039                        |            | NotFnd                     | <1.6          | 1.6          | U          |             | 50       |
| PCB-038                        |            | NotFnd                     | <1.8          | 1.8          | U          |             | 50       |
| PCB-035                        |            | NotFnd                     | <1.8          | 1.8          | U          |             | 50       |
| PCB-037                        |            | NotFnd                     | <2.5          | 2.5          | U          |             | 50       |
| PCB-054                        |            | NotFnd                     | <0.66         | 0.66         | U          |             | 50       |
| PCB-050/053                    |            | NotFnd                     | <1.2          | 1.2          | U          |             | 50       |
| PCB-045/051<br>PCB-046         |            | 16.09<br>NotFnd            | 1.48<br><1.4  | 1.2<br>1.4   | M,J<br>U   |             | 50<br>50 |
| PCB-046<br>PCB-052             |            | 16.99                      | <1.4<br>2.96  | 1.4          | j          |             | 50       |
| PCB-073                        |            | NotFnd                     | < 0.93        | 0.93         | Ú          |             | 50       |
| PCB-043                        |            | NotFnd                     | <1.6          | 1.6          | Ü          |             | 50       |
| PCB-049/069                    |            | 17.26                      | <1.3          | 1.1          | M,J,R      | 1.3         | 50       |
| PCB-048                        |            | NotFnd                     | <1.3          | 1.3          | U          |             | 50       |
| PCB-044/047/065                |            | 17.57                      | 5.13          | 1.2          | J          |             | 50       |
| PCB-059/062/075                |            | NotFnd                     | < 0.97        | 0.97         | U          |             | 50       |
| PCB-042<br>PCB-040/041/071     |            | NotFnd                     | <1.5<br>1.36  | 1.5<br>1.3   | U          |             | 50<br>50 |
| PCB-040/041/071<br>PCB-064     |            | 18.14<br>18.24             | 1.36<br><1.0  | 1.3<br>0.97  |            | 1.0         | 50<br>50 |
| PCB-072                        |            | NotFnd                     | <1.4          | 1.4          | U          | 2.0         | 50       |
| PCB-068                        |            | NotFnd                     | <1.3          | 1.3          | Ü          |             | 50       |
| PCB-057                        |            | NotFnd                     | <1.5          | 1.5          | U          |             | 50       |
| PCB-058                        |            | NotFnd                     | <1.4          | 1.4          | U          |             | 50       |
| PCB-067                        |            | NotFnd                     | <1.3          | 1.3          | U          |             | 50       |
| PCB-063                        |            | NotFnd                     | <1.4          | 1.4          | U          | 2.0         | 50       |
| PCB-061/070/074/076<br>PCB-066 |            | 19.62<br>19.80             | <2.8<br><1.4  | 1.4<br>1.4   | M,J,R<br>U | 2.8<br>0.69 | 50<br>50 |
| PCB-066<br>PCB-055             |            | NotFnd                     | <1.4<br><1.5  | 1.4          | U          | 0.09        | 50       |
| PCB-056                        |            | 20.15                      | 1.89          | 1.5          | м,ј        |             | 50       |
| PCB-060                        |            | NotFnd                     | <1.5          | 1.5          | U          |             | 50       |
| PCB-080                        |            | NotFnd                     | <1.3          | 1.3          | U          |             | 50       |
| PCB-079                        |            | NotFnd                     | <1.4          | 1.4          | U          |             | 50       |
| PCB-078                        |            | NotFnd                     | <1.7          | 1.7          | U          |             | 50       |
| PCB-081                        | 0.0003     | NotFnd                     | <1.9          | 1.9          | U          |             | 50       |
| PCB-077                        | 0.0001     | NotFnd                     | <2.1          | 2.1          | U          |             | 50       |
| PCB-104                        |            | NotFnd                     | < 0.94        | 0.94         | U          |             | 50       |
|                                |            | NotFnd                     | <1.0<br><1.7  | 1.0<br>1.7   | U          |             | 50<br>50 |
| PCB-103                        |            |                            |               |              |            |             |          |
| PCB-103                        |            | NotFnd<br>NotFnd           |               |              |            |             |          |
|                                |            | NotFnd<br>NotFnd<br>NotFnd | <1.9<br><1.8  | 1.9          | U          |             | 50<br>50 |

#### **Laboratory Method Blank Analysis Report**

Split Ratio

 Sample Name
 Method Blank

 ALS Sample ID
 WG3440853-1

 Analysis Method
 EPA 1668C

 Analysis Type
 Blank

 Sample Matrix
 Swab

Sampling Date n/a
Extraction Date 25-Nov-20
Sample Size 1
Percent Moisture n/a

1 Blank *E. Sabljic*n/a --e-signature-2 01-Dec-2020

Approved:

 Run Information
 Run I

 Filename
 5-2011 J □ E1

 Run Date
 01-De-2 J □ C17

 Final Volume
 25 □ I

 Dilution Factor
 1

 Analysis Units
 pg □

|                                    | TEF        | Ret.             | Conc.          | EDL          |       | EMPC |          |
|------------------------------------|------------|------------------|----------------|--------------|-------|------|----------|
| Target Analytes                    | (WHO 2005) | Time             | pg             | pg Fl        | lags  | pg   | LQL      |
| PCB-088/091                        |            | NotFnd           | <1.9           | 1.9          | U     |      | 50       |
| PCB-084                            |            | NotFnd           | <2.1           | 2.1          | U     |      | 50       |
| PCB-089                            |            | NotFnd           | <2.1           | 2.1          | U     |      | 50       |
| PCB-121                            |            | NotFnd           | <1.4           | 1.4          | U     |      | 50       |
| PCB-092                            |            | NotFnd           | <2.1           | 2.1          | U     |      | 50       |
| PCB-090/101/113                    |            | 20.63            | 3.82           | 1.7          | М,Ј   |      | 50       |
| PCB-083/099                        |            | NotFnd           | <2.1           | 2.1          | U     |      | 50       |
| PCB-112                            |            | NotFnd           | <1.5           | 1.5          | U     |      | 50       |
| PCB-086/087/097/109/119/125        |            | NotFnd<br>NotFnd | <1.8           | 1.8          | U     |      | 50<br>50 |
| PCB-085/110/115/116/117<br>PCB-082 |            | NotFnd<br>NotFnd | <1.7<br><2.7   | 1.7<br>2.7   | U     |      | 50<br>50 |
| PCB-082<br>PCB-111                 |            | NotFnd<br>NotFnd | <2.7<br><1.5   | 2.7<br>1.5   | U     |      | 50<br>50 |
| PCB-111<br>PCB-120                 |            | NotFnd<br>NotFnd | <1.5<br><1.5   | 1.5          | U     |      | 50<br>50 |
| PCB-120<br>PCB-108/124             |            | NotFnd<br>NotFnd | <1.5<br><1.7   | 1.5          | U     |      | 50<br>50 |
| PCB-100/124<br>PCB-107             |            | NotFnd           | <1.7           | 1.5          | U     |      | 50       |
| PCB-123                            | 0.00003    | NotFnd           | <2.0           | 2.0          | U     |      | 50       |
| PCB-106                            |            | NotFnd           | <1.8           | 1.8          | Ü     |      | 50       |
| PCB-118                            | 0.00003    | NotFnd           | <1.8           | 1.8          | U     |      | 50       |
| PCB-122                            |            | NotFnd           | <1.9           | 1.9          | U     |      | 50       |
| PCB-114                            | 0.00003    | NotFnd           | <1.9           | 1.9          | U     |      | 50       |
| PCB-105                            | 0.00003    | NotFnd           | <1.9           | 1.9          | U     |      | 50       |
| PCB-127                            |            | NotFnd           | <1.9           | 1.9          | U     |      | 50       |
| PCB-126                            | 0.1        | 25.56            | <2.4           | 2.4          | M,J,R |      | 50       |
| PCB-155                            |            | NotFnd           | <1.2           | 1.2          | U     |      | 50       |
| PCB-152                            |            | NotFnd           | < 0.76         | 0.76         | U     |      | 50       |
| PCB-150<br>PCB-136                 |            | NotFnd<br>NotFnd | <0.73          | 0.73         | U     |      | 50<br>50 |
| PCB-136<br>PCB-145                 |            | NotFnd<br>NotFnd | <0.79<br><0.80 | 0.79<br>0.80 | U     |      | 50<br>50 |
| PCB-145<br>PCB-148                 |            | NotFnd<br>NotFnd | <0.80<br><1.1  | 1.1          | U     |      | 50<br>50 |
| PCB-148<br>PCB-135/151             |            | NotFnd           | <1.1<br><1.2   | 1.1          | U     |      | 50       |
| PCB-135/151<br>PCB-154             |            | NotFnd           | <0.93          | 0.93         | U     |      | 50       |
| PCB-154<br>PCB-144                 |            | NotFnd           | <1.2           | 1.2          | U     |      | 50       |
| PCB-147/149                        |            | 22.66            | 4.64           | 1.2          | j     |      | 50       |
| PCB-134/143                        |            | NotFnd           | <1.5           | 1.5          | Ú     |      | 50       |
| PCB-139/140                        |            | NotFnd           | <1.2           | 1.2          | Ü     |      | 50       |
| PCB-131                            |            | NotFnd           | <1.6           | 1.6          | U     |      | 50       |
| PCB-142                            |            | NotFnd           | <1.5           | 1.5          | U     |      | 50       |
| PCB-132                            |            | NotFnd           | <1.5           | 1.5          | U     |      | 50       |
| PCB-133                            |            | NotFnd           | <1.4           | 1.4          | U     |      | 50       |
| PCB-165                            |            | NotFnd           | <1.1           | 1.1          | U     |      | 50       |
| PCB-146                            |            | NotFnd           | <1.3           | 1.3          | U     |      | 50       |
| PCB-161                            |            | NotFnd           | <1.1           | 1.1          | U     |      | 50       |
| PCB-153/168                        |            | 24.18<br>NotEnd  | 4.17           | 1.1          | M,J   |      | 50       |
| PCB-141                            |            | NotFnd<br>NotFnd | <1.5           | 1.5          | U     |      | 50<br>50 |
| PCB-130<br>PCB-137/164             |            | NotFnd<br>NotFnd | <1.7<br><1.3   | 1.7<br>1.3   | U     |      | 50<br>50 |
| PCB-13//164<br>PCB-129/138/163     |            | 24.88            | <1.3<br>2.90   | 1.3          | J     |      | 50<br>50 |
| PCB-129/138/163<br>PCB-160         |            | 24.88<br>NotFnd  | <1.2           | 1.4          | U     |      | 50       |
| PCB-158                            |            | NotFnd           | <0.95          | 0.95         | U     |      | 50       |
| PCB-128/166                        |            | NotFnd           | <1.3           | 1.3          | U     |      | 50       |
| PCB-129/100                        |            | NotFnd           | <1.1           | 1.1          | U     |      | 50       |
| PCB-162                            |            | NotFnd           | <1.2           | 1.2          | U     |      | 50       |
| PCB-167                            | 0.00003    | NotFnd           | <0.88          | 0.88         | Ü     |      | 50       |
| PCB-156/157                        | 0.00003    | 27.03            | 1.57           | 1.2          | М,Ј   |      | 100      |
| PCB-169                            | 0.03       | NotFnd           | <1.1           | 1.1          | U     |      | 50       |
| PCB-188                            |            | NotFnd           | <1.5           | 1.5          | U     |      | 50       |
| PCB-179                            |            | NotFnd           | <1.2           | 1.2          | U     |      | 50       |
| PCB-184                            |            | NotFnd           | <1.1           | 1.1          | U     |      | 50       |
| PCB-176                            |            | NotFnd           | <1.2           | 1.2          | U     |      | 50       |
| PCB-186                            |            | NotFnd           | <1.2           | 1.2          | U     |      | 50       |
| PCB-178                            |            | NotFnd           | <1.8           | 1.8          | U     |      | 50       |
| PCB-175                            |            | NotFnd           | <1.8           | 1.8          | U     |      | 50       |
| PCB-187                            |            | 25.54            | 2.24           | 1.5          | J     |      | 50       |
| PCB-182                            |            | NotFnd           | <1.7           | 1.7          | U     |      | 50       |
| PCB-183                            |            | NotFnd           | <1.7           | 1.7          | U     |      | 50       |
| PCB-185                            |            | NotFnd<br>NotFnd | <1.7           | 1.7          | U     |      | 50<br>50 |
| PCB-174                            |            | NotFnd<br>NotFnd | <1.8           | 1.8          | U     |      | 50<br>50 |
| PCB-177<br>PCB-181                 |            | NotFnd<br>NotFnd | <1.9<br><1.8   | 1.9          | U     |      | 50<br>50 |
| PCB-181<br>PCB-171/173             |            | NotFnd<br>NotFnd | <1.8<br><2.0   | 1.8<br>2.0   | U     |      | 50<br>50 |
| PCB-171/173<br>PCB-172             |            | NotFnd<br>NotFnd | <2.0<br><2.0   | 2.0<br>2.0   | U     |      | 50<br>50 |
| FCD-1/2                            |            | uu               | ~ Z.U          | ۷.٠          |       |      | - 50     |

#### **Laboratory Method Blank Analysis Report**

Split Ratio

 Sample Name
 Method Blank

 ALS Sample ID
 WG3440853-1

 Analysis Method
 EPA 1668C

 Analysis Type
 Blank

 Sample Matrix
 Swab

Sampling Date n/a
Extraction Date 25-Nov-20
Sample Size 1
Percent Moisture n/a

Blank

E. Sabljic --e-signature--01-Dec-2020

Approved:

 Run Information
 Run 1

 Filename
 5-201130B21

 Run Date
 01-Dec-20 00:17

 Final Volume
 25 ul

 Dilution Factor
 1

 Analysis Units
 pg

| get Analytes                   |              |        |                | EDL      | EMPC            |                 |
|--------------------------------|--------------|--------|----------------|----------|-----------------|-----------------|
|                                | (WHO 2005)   | Time   | pg             | pg Flags | p               | g LQL           |
| PCB-192                        |              | NotFnd | <1.5           | 1.5      | U               | 50              |
| PCB-192<br>PCB-180/193         |              | NotFnd | <1.5           | 1.5      | U               | 50              |
|                                |              |        |                |          |                 |                 |
| PCB-191                        |              | NotFnd | <1.3           | 1.3      | U               | 50              |
| PCB-170                        |              | NotFnd | <1.5           | 1.5      | U               | 50              |
| PCB-190                        | 0.00         | NotFnd | < 0.94         | 0.94     | U               | 50              |
| PCB-189                        | 0.00003      | NotFnd | < 0.67         | 0.67     | U               | 50              |
| PCB-202                        |              | NotFnd | <1.9           | 1.9      | U               | 50              |
| PCB-201                        |              | NotFnd | <1.7           | 1.7      | U               | 50              |
| PCB-204                        |              | NotFnd | <1.6           | 1.6      | U               | 50              |
| PCB-197                        |              | NotFnd | <1.6           | 1.6      | U               | 50              |
| PCB-200                        |              | NotFnd | <1.7           | 1.7      | U               | 50              |
| PCB-198/199                    |              | NotFnd | <1.6           | 1.6      | U               | 50              |
| PCB-196                        |              | NotFnd | <1.6           | 1.6      | U               | 50              |
| PCB-203                        |              | 29.13  | <1.6           | 1.6      | U 1.1           | 50              |
| PCB-195                        |              | NotFnd | <1.7           | 1.7      | U               | 50              |
| PCB-194                        |              | 31.06  | <2.1           | 1.8      | J,R 2.1         | 50              |
| PCB-205                        |              | NotFnd | <1.4           | 1.4      | U               | 50              |
| PCB-208                        |              | NotFnd | <3.7           | 3.7      | U               | 50              |
| PCB-207                        |              | NotFnd | <3.0           | 3.0      | U               | 50              |
| PCB-206                        |              | NotFnd | <3.3           | 3.3      | U               | 50              |
| PCB-209                        |              | 33.54  | 270            | 17       |                 | 50              |
|                                |              |        |                |          |                 |                 |
| Extraction Standards           | pg           | Time   | % Rec          | Limits   |                 |                 |
|                                |              |        |                |          |                 |                 |
| 13C12-PCB-001                  | 2000         | 8.92   | 64             |          |                 |                 |
| 13C12-PCB-003                  | 2000         | 10.48  | 56             |          |                 |                 |
| 13C12-PCB-004                  | 2000         | 10.62  | 63             | 5-145    |                 |                 |
| 13C12-PCB-015                  | 2000         | 14.33  | 56             | 5-145    |                 |                 |
| 13C12-PCB-019                  | 2000         | 12.62  | 63             | 5-145    |                 |                 |
| 13C12-PCB-037                  | 2000         | 18.28  | 58             | 5-145    |                 |                 |
| 13C12-PCB-054                  | 2000         | 14.47  | 78             |          |                 |                 |
| 13C12-PCB-081                  | 2000         | 21.83  | 70             | 10-145   |                 |                 |
| 13C12-PCB-077                  | 2000         | 22.14  | 67             | 10-145   |                 |                 |
| 13C12-PCB-104                  | 2000         | 17.50  | 91             | 10-145   |                 |                 |
| 13C12-PCB-123                  | 2000         | 23.09  | 67             | 10-145   |                 |                 |
| 13C12-PCB-118                  | 2000         | 23.26  | 68             | 10-145   |                 |                 |
| 13C12-PCB-114                  | 2000         | 23.56  | 70             | 10-145   |                 |                 |
| 13C12-PCB-105                  | 2000         | 23.91  | 70             | 10-145   |                 |                 |
| 13C12-PCB-126                  | 2000         | 25.52  | 66             | 10-145   |                 |                 |
| 13C12-PCB-155                  | 2000         | 20.48  | 33             | 10-145   |                 |                 |
| 13C12-PCB-167                  | 2000         | 26.39  |                | 10-145   |                 |                 |
| 13C12-PCB-156/157              | 4000         | 27.03  |                | 10-145   |                 |                 |
| 13C12-PCB-169                  | 2000         | 28.70  |                | 10-145   |                 |                 |
| 13C12-PCB-188                  | 2000         | 23.48  |                | 10-145   |                 |                 |
| 13C12-PCB-189                  | 2000         | 29.95  |                | 10-145   |                 |                 |
| 13C12-PCB-202                  | 2000         | 26.26  |                | 10-145   |                 |                 |
| 13C12-PCB-205                  | 2000         | 31.33  |                | 10-145   |                 |                 |
| 13C12-PCB-203                  | 2000         | 29.67  |                | 10-145   |                 |                 |
| 13C12-PCB-206                  | 2000         | 32.39  |                | 10-145   |                 |                 |
| 13C12-PCB-209                  | 2000         | 33.51  |                | 10-145   |                 |                 |
| 13C12-PCB-209                  | 2000         | 33.31  | 20             | 10-145   |                 |                 |
| Cleanup Standards              |              |        |                |          |                 |                 |
| 13C12-PCB-028                  | 2000         | 16.01  | 70             | 5-145    |                 |                 |
|                                |              |        |                |          |                 |                 |
|                                | 2000         |        |                |          |                 |                 |
| 13C12-PCB-028<br>13C12-PCB-111 | 2000<br>2000 |        | 16.01<br>22.01 | 22.01 71 | 22.01 71 10-145 | 22.01 71 10-145 |

#### **ALS Life Sciences Laboratory Method Blank Analysis Report** Method Blank Sampling Date ALS Sample ID WG3440853-1 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Blank E. Sabljic Analysis Type Blank Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Swab **Run Information** Run 1 Filename 5-201130B21 01-Dec-20 00:17 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 10.6 0.62 200 Total DiCB 400 33.0 2.2 Total TriCB 400 Total TetraCB Total PentaCB 17.9 0.66 0.94 800 3.82 800 Total HexaCB Total HeptaCB 2.24 0.67 400 Total OctaCB 400 2.10 1.4 Total NonaCB 3.0 200 <3.0 DecaCB 270 17 200 Total PCB 369 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.0000471 Mid Point PCB TEO 0.257 Upper Bound PCB TEQ 0.274 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.

TEQ

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates the Toxic Equivalency

TEF

LQL M

U

EMPC

Indicates the Toxic Equivalency Factor

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

#### **Laboratory Method Blank Analysis Report**

Split Ratio

Method Blank ALS Sample ID WG3440853-4 Analysis Method EPA 1668C Analysis Type Blank Sample Matrix Reagent

Sampling Date 25-Nov-20 Extraction Date Sample Size Percent Moisture

n/a

E. Sabljic --e-signature--01-Dec-2020 Blank

Approved:

Run Information Run 1 Filename Run Date 5-201130B22 01-Dec-20 01:00 Final Volume 25 Dilution Factor Analysis Units pg

HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                            | TEF        | Ret.             | Conc.  | EDL  |          | EMPC |          |
|----------------------------|------------|------------------|--------|------|----------|------|----------|
| Target Analytes            | (WHO 2005) | Time             | pg pg  |      | lags     | pg   | LQL      |
|                            | ( 2000)    |                  | 13     | PB'  | 9-       | 29   |          |
| PCB-001                    |            | 8.94             | <1.1   | 0.44 | M,J,R    |      | 50       |
| PCB-002                    |            | 10.37            | <2.0   | 0.49 | J,R      | 2.0  | 50       |
| PCB-003                    |            | 10.48            | <2.5   | 0.49 | M,J,R    | 2.5  | 50       |
| PCB-004                    |            | NotFnd           | <2.5   | 2.5  | U        |      | 50       |
| PCB-010                    |            | NotFnd           | <1.7   | 1.7  | U        |      | 50       |
| PCB-009                    |            | NotFnd           | <1.7   | 1.7  | U        |      | 50       |
| PCB-007                    |            | NotFnd           | <1.7   | 1.7  | U        |      | 50       |
| PCB-006                    |            | NotFnd           | <1.7   | 1.7  | U        |      | 50       |
| PCB-005                    |            | NotFnd           | <1.9   | 1.9  | U        |      | 50       |
| PCB-008                    |            | 12.43            | <3.5   | 1.6  | M,J,R    | 3.5  | 50       |
| PCB-014                    |            | NotFnd           | <1.8   | 1.8  | U        |      | 50       |
| PCB-011                    |            | 13.95            | 22.7   | 1.9  | J        |      | 50       |
| PCB-012/013                |            | NotFnd           | <1.9   | 1.9  | U        |      | 50       |
| PCB-015                    |            | NotFnd           | <2.3   | 2.3  | U        |      | 50       |
| PCB-019                    |            | NotFnd           | < 0.92 | 0.92 | U        |      | 50       |
| PCB-018/030                |            | NotFnd           | < 0.94 | 0.94 | U        |      | 50       |
| PCB-017                    |            | 13.98            | <1.1   | 1.1  | U        | 1.0  | 50       |
| PCB-027                    |            | NotFnd           | < 0.82 | 0.82 | U        |      | 50       |
| PCB-024                    |            | NotFnd           | < 0.82 | 0.82 | U        |      | 50       |
| PCB-016                    |            | 14.28            | <1.3   | 1.3  |          | 0.71 | 50       |
| PCB-032                    |            | 14.56            | < 0.77 | 0.77 | U        | _    | 50       |
| PCB-034                    |            | NotFnd           | <1.0   | 1.0  | Ü        |      | 50       |
| PCB-023                    |            | NotFnd           | < 0.94 | 0.94 | Ü        |      | 50       |
| PCB-026/029                |            | NotFnd           | < 0.94 | 0.94 | U        |      | 50       |
| PCB-025                    |            | NotFnd           | < 0.85 | 0.85 | Ü        |      | 50       |
| PCB-031                    |            | 15.85            | 3.65   | 0.88 | j        |      | 50       |
| PCB-020/028                |            | NotFnd           | < 0.93 | 0.93 | Ú        |      | 50       |
| PCB-021/033                |            | 16.14            | <1.9   | 0.92 | M,J,R    | 1.9  | 50       |
| PCB-022                    |            | 16.40            | 2.34   | 0.98 | J-1,5,10 |      | 50       |
| PCB-036                    |            | NotFnd           | < 0.94 | 0.94 | Ú        |      | 50       |
| PCB-039                    |            | NotFnd           | < 0.96 | 0.96 | U        |      | 50       |
| PCB-039                    |            | NotFnd           | <1.0   | 1.0  | U        |      | 50       |
| PCB-035                    |            | NotFnd           | <1.1   | 1.1  | U        |      | 50       |
| PCB-037                    |            | 18.27            | 1.81   | 1.4  | j        |      | 50       |
| PCB-054                    |            | NotFnd           | < 0.39 | 0.39 | U        |      | 50       |
| PCB-050/053                |            |                  | <0.39  | 0.39 |          |      | 50       |
| PCB-045/053<br>PCB-045/051 |            | NotFnd<br>NotFnd | <0.78  | 0.78 | U        |      | 50       |
|                            |            |                  |        |      |          |      |          |
| PCB-046                    |            | NotFnd<br>16.00  | < 0.94 | 0.94 | U        |      | 50<br>E0 |
| PCB-052                    |            | 16.99            | 3.01   | 0.83 | J        |      | 50       |
| PCB-073                    |            | NotFnd           | < 0.62 | 0.62 | U        |      | 50       |
| PCB-043                    |            | NotFnd           | <1.1   | 1.1  | U        |      | 50       |
| PCB-049/069                |            | 17.26            | <1.3   | 0.75 | M,J,R    | 1.3  | 50       |
| PCB-048                    |            | 17.44            | <0.84  | 0.84 | U        |      | 50       |
| PCB-044/047/065            |            | 17.56            | <4.4   | 0.78 | J,R      | 4.4  | 50       |
| PCB-059/062/075            |            | NotFnd           | < 0.64 | 0.64 | U        |      | 50       |
| PCB-042                    |            | NotFnd           | < 0.97 | 0.97 | U        |      | 50       |
| PCB-040/041/071            |            | NotFnd           | <0.89  | 0.89 | U        |      | 50       |
| PCB-064                    |            | 18.24            | 1.16   | 0.64 | J        |      | 50       |
| PCB-072                    |            | NotFnd           | < 0.69 | 0.69 | U        |      | 50       |
| PCB-068                    |            | 18.81            | < 0.65 | 0.65 | U        | 0.37 | 50       |
| PCB-057                    |            | NotFnd           | < 0.73 | 0.73 | U        |      | 50       |
| PCB-058                    |            | NotFnd           | < 0.67 | 0.67 | U        |      | 50       |
| PCB-067                    |            | NotFnd           | < 0.61 | 0.61 | U        |      | 50       |
| PCB-063                    |            | NotFnd           | < 0.68 | 0.68 | U        |      | 50       |
| PCB-061/070/074/076        |            | 19.60            | <3.4   | 0.69 | M,J,R    | 3.4  | 50       |
| PCB-066                    |            | 19.79            | <0.80  | 0.69 | J,R      | 0.80 | 50       |
| PCB-055                    |            | NotFnd           | < 0.75 | 0.75 | U        |      | 50       |
| PCB-056                    |            | 20.16            | <0.78  | 0.75 | J,R      | 0.78 | 50       |
| PCB-060                    |            | NotFnd           | < 0.74 | 0.74 | U        |      | 50       |
| PCB-080                    |            | NotFnd           | < 0.65 | 0.65 | U        |      | 50       |
| PCB-079                    |            | NotFnd           | <0.68  | 0.68 | U        |      | 50       |
| PCB-078                    |            | NotFnd           | < 0.81 | 0.81 | U        |      | 50       |
| PCB-081                    | 0.0003     | NotFnd           | < 0.89 | 0.89 | U        |      | 50       |
| PCB-077                    | 0.0001     | 22.14            | <0.94  | 0.94 |          | 0.93 | 50       |
| PCB-104                    |            | NotFnd           | < 0.75 | 0.75 | U        |      | 50       |
| PCB-096                    |            | NotFnd           | <0.70  | 0.70 | U        |      | 50       |
| PCB-103                    |            | NotFnd           | < 0.96 | 0.96 | U        |      | 50       |
| PCB-094                    |            | NotFnd           | <1.1   | 1.1  | U        |      | 50       |
| PCB-095                    |            | NotFnd           | <1.0   | 1.0  | U        |      | 50       |
| PCB-093/098/100/102        |            | NotFnd           | <1.1   | 1.1  | U        |      | 50       |

#### **Laboratory Method Blank Analysis Report**

Split Ratio

Method Blank ALS Sample ID WG3440853-4 Analysis Method EPA 1668C Analysis Type Blank Sample Matrix Reagent

Sampling Date 25-Nov-20 Extraction Date Sample Size Percent Moisture

n/a

Blank E. Sabljic --e-signature--01-Dec-2020

Approved:

Run Information Run 1 Filename Run Date 5-201130B22 01-Dec-20 01:00 Final Volume 25 Dilution Factor Analysis Units pg

|                             | TEF                | Ret.             | Conc.          | EDL          |       | ЕМРС       |          |
|-----------------------------|--------------------|------------------|----------------|--------------|-------|------------|----------|
| Target Analytes             | TEF<br>(WHO 2005)  | Ret.<br>Time     | Conc.<br>pg    | pg Fla       | ags   | EMPC<br>pg | LQL      |
|                             | ,                  |                  |                |              |       |            |          |
| PCB-088/091<br>PCB-084      |                    | NotFnd<br>19.74  | <1.1<br><1.2   | 1.1          | U     |            | 50<br>50 |
| PCB-089                     |                    | NotFnd           | <1.2           | 1.2          | U     |            | 50       |
| PCB-121                     |                    | NotFnd           | < 0.81         | 0.81         | U     |            | 50       |
| PCB-092                     |                    | NotFnd           | <1.2           | 1.2          | U     |            | 50       |
| PCB-090/101/113             |                    | 20.63            | 1.94           | 0.97         | М,Ј   |            | 50       |
| PCB-083/099<br>PCB-112      |                    | NotFnd<br>NotFnd | <1.2<br><0.85  | 1.2<br>0.85  | U     |            | 50<br>50 |
| PCB-086/087/097/109/119/125 |                    | NotFnd           | <1.0           | 1.0          | U     |            | 50       |
| PCB-085/110/115/116/117     |                    | 21.72            | 2.93           | 0.96         | j     |            | 50       |
| PCB-082                     |                    | NotFnd           | <1.6           | 1.6          | U     |            | 50       |
| PCB-111                     |                    | NotFnd           | < 0.87         | 0.87         | U     |            | 50       |
| PCB-120                     |                    | NotFnd<br>NotFnd | <0.87<br><1.1  | 0.87<br>1.1  | U     |            | 50<br>50 |
| PCB-108/124<br>PCB-107      |                    | NotFnd           | <1.1           | 1.0          | U     |            | 50       |
| PCB-123                     | 0.00003            | NotFnd           | <1.2           | 1.2          | Ü     |            | 50       |
| PCB-106                     |                    | NotFnd           | <1.2           | 1.2          | U     |            | 50       |
| PCB-118                     | 0.00003            | NotFnd           | <1.2           | 1.2          | U     |            | 50       |
| PCB-122                     |                    | NotFnd           | <1.3           | 1.3          | U     |            | 50       |
| PCB-114<br>PCB-105          | 0.00003<br>0.00003 | NotFnd<br>NotFnd | <1.2<br><1.3   | 1.2          | U     |            | 50<br>50 |
| PCB-103                     | 0.00003            | NotFnd           | <1.3           | 1.3          | U     |            | 50       |
| PCB-126                     | 0.1                | 25.50            | <1.5           | 1.5          | M,U   |            | 50       |
| PCB-155                     |                    | NotFnd           | < 0.67         | 0.67         | U     |            | 50       |
| PCB-152                     |                    | NotFnd           | < 0.49         | 0.49         | U     |            | 50       |
| PCB-150                     |                    | NotFnd           | < 0.47         | 0.47         | U     |            | 50       |
| PCB-136<br>PCB-145          |                    | NotFnd<br>NotFnd | <0.51<br><0.51 | 0.51<br>0.51 | U     |            | 50<br>50 |
| PCB-148                     |                    | NotFnd           | < 0.72         | 0.72         | U     |            | 50       |
| PCB-135/151                 |                    | NotFnd           | < 0.77         | 0.77         | U     |            | 50       |
| PCB-154                     |                    | NotFnd           | < 0.60         | 0.60         | U     |            | 50       |
| PCB-144                     |                    | NotFnd           | < 0.78         | 0.78         | U     |            | 50       |
| PCB-147/149                 |                    | 22.66            | <1.4           | 1.2          | J,R   |            | 50       |
| PCB-134/143                 |                    | NotFnd           | <1.4           | 1.4          | U     |            | 50       |
| PCB-139/140<br>PCB-131      |                    | NotFnd<br>NotFnd | <1.2<br><1.5   | 1.2          | U     |            | 50<br>50 |
| PCB-142                     |                    | NotFnd           | <1.4           | 1.4          | U     |            | 50       |
| PCB-132                     |                    | NotFnd           | <1.4           | 1.4          | U     |            | 50       |
| PCB-133                     |                    | NotFnd           | <1.4           | 1.4          | U     |            | 50       |
| PCB-165                     |                    | NotFnd           | <1.0           | 1.0          | U     |            | 50       |
| PCB-146                     |                    | NotFnd           | <1.2           | 1.2          | U     |            | 50       |
| PCB-161<br>PCB-153/168      |                    | NotFnd<br>24 19  | <1.0<br>1.81   | 1.0          | U     |            | 50<br>50 |
| PCB-153/168<br>PCB-141      |                    | 24.19<br>NotFnd  | <1.4           | 1.4          | U     |            | 50       |
| PCB-130                     |                    | NotFnd           | <1.7           | 1.7          | U     |            | 50       |
| PCB-137/164                 |                    | NotFnd           | <1.2           | 1.2          | U     |            | 50       |
| PCB-129/138/163             |                    | 24.89            | <2.6           | 1.4          | M,J,R |            | 50       |
| PCB-160                     |                    | NotFnd           | <1.1           | 1.1          | U     |            | 50       |
| PCB-158<br>PCB-128/166      |                    | NotFnd<br>NotFnd | <0.90<br><1.2  | 0.90<br>1.2  | U     |            | 50<br>50 |
| PCB-128/166<br>PCB-159      |                    | NotFnd           | <1.2           | 1.1          | U     |            | 50       |
| PCB-162                     |                    | NotFnd           | <1.1           | 1.1          | U     |            | 50       |
| PCB-167                     | 0.00003            | NotFnd           | <0.88          | 0.88         | U     |            | 50       |
| PCB-156/157                 | 0.00003            | NotFnd           | <1.2           | 1.2          | U     |            | 100      |
| PCB-169                     | 0.03               | 28.70            | < 0.99         | 0.99         | U     |            | 50       |
| PCB-188                     |                    | NotFnd           | < 0.69         | 0.69         | U     |            | 50<br>50 |
| PCB-179<br>PCB-184          |                    | NotFnd<br>NotFnd | <0.63<br><0.57 | 0.63<br>0.57 | U     |            | 50       |
| PCB-176                     |                    | NotFnd           | < 0.64         | 0.64         | U     |            | 50       |
| PCB-186                     |                    | NotFnd           | < 0.66         | 0.66         | U     |            | 50       |
| PCB-178                     |                    | NotFnd           | < 0.97         | 0.97         | U     |            | 50       |
| PCB-175                     |                    | NotFnd           | < 0.97         | 0.97         | U     |            | 50       |
| PCB-187                     |                    | NotFnd           | <0.82          | 0.82         | U     |            | 50       |
| PCB-182                     |                    | NotFnd           | < 0.90         | 0.90         | U     |            | 50       |
| PCB-183<br>PCB-185          |                    | NotFnd<br>NotFnd | <0.91<br><0.93 | 0.91<br>0.93 | U     |            | 50<br>50 |
| PCB-185<br>PCB-174          |                    | NotFnd           | <0.93          | 0.93         | U     |            | 50       |
| PCB-174<br>PCB-177          |                    | NotFnd           | <1.0           | 1.0          | U     |            | 50       |
| PCB-181                     |                    | NotFnd           | < 0.97         | 0.97         | U     |            | 50       |
| PCB-171/173                 |                    | NotFnd           | <1.1           | 1.1          | U     |            | 50       |
| PCB-172                     |                    | NotFnd           | <1.1           | 1.1          | U     |            | 50       |

#### **Laboratory Method Blank Analysis Report**

Split Ratio

 Sample Name
 Method Blank

 ALS Sample ID
 WG3440853-4

 Analysis Method
 EPA 1668C

 Analysis Type
 Blank

 Sample Matrix
 Reagent

Sampling Date n/a
Extraction Date 25-Nov-20
Sample Size 1
Percent Moisture n/a

Blank *E. Sabljic* --e-signature--01-Dec-2020

Approved:

 Run Information
 Run I

 Filename
 5-2011-30-22

 Run Date
 01-De-2-01:00

 Final Volume
 25
 ul

 Dilution Factor
 1
 val

 Analysis Units
 pg
 val

|                                                 | TEF          | Ret.           | Conc.  | EDL             | EMPC |     |
|-------------------------------------------------|--------------|----------------|--------|-----------------|------|-----|
| arget Analytes                                  | (WHO 2005)   | Time           | pg     | pg Flags        | pg   | LQL |
| PCB-192                                         |              | NotFnd         | <0.82  | 0.82            | U    | 50  |
| PCB-192<br>PCB-180/193                          |              | NotFnd         | < 0.82 | 0.82            | U    | 50  |
|                                                 |              |                |        |                 |      |     |
| PCB-191                                         |              | NotFnd         | < 0.69 | 0.69            | U    | 50  |
| PCB-170                                         |              | NotFnd         | <0.80  | 0.80            | U    | 50  |
| PCB-190                                         |              | NotFnd         | <0.50  | 0.50            | U    | 50  |
| PCB-189                                         | 0.00003      | NotFnd         | <0.48  | 0.48            | U    | 50  |
| PCB-202                                         |              | NotFnd         | <0.89  | 0.89            | U    | 50  |
| PCB-201                                         |              | NotFnd         | <0.83  | 0.83            | U    | 50  |
| PCB-204                                         |              | NotFnd         | < 0.82 | 0.82            | U    | 50  |
| PCB-197                                         |              | NotFnd         | < 0.81 | 0.81            | U    | 50  |
| PCB-200                                         |              | NotFnd         | < 0.84 | 0.84            | U    | 50  |
| PCB-198/199                                     |              | NotFnd         | <0.80  | 0.80            | U    | 50  |
| PCB-196                                         |              | NotFnd         | < 0.79 | 0.79            | U    | 50  |
| PCB-203                                         |              | NotFnd         | < 0.78 | 0.78            | U    | 50  |
| PCB-195                                         |              | NotFnd         | < 0.76 | 0.76            | U    | 50  |
| PCB-194                                         |              | NotFnd         | < 0.80 | 0.80            | U    | 50  |
| PCB-205                                         |              | NotFnd         | < 0.67 | 0.67            | U    | 50  |
| PCB-208                                         |              | NotFnd         | <2.6   | 2.6             | U    | 50  |
| PCB-207                                         |              | NotFnd         | <2.3   | 2.3             | U    | 50  |
| PCB-206                                         |              | NotFnd         | <2.7   | 2.7             | U    | 50  |
| PCB-209                                         |              | 33.53          | 112    |                 | М    | 50  |
| . 25 207                                        |              |                |        |                 |      |     |
| <b>Extraction Standards</b>                     | pg           | Time           | % Rec  | Limits          |      |     |
|                                                 |              |                |        |                 |      |     |
| 13C12-PCB-001                                   | 2000         | 8.94           | 55     | 5-145           |      |     |
| 13C12-PCB-003                                   | 2000         | 10.48          | 54     | 5-145           |      |     |
| 13C12-PCB-004                                   | 2000         | 10.62          | 62     | 5-145           |      |     |
| 13C12-PCB-015                                   | 2000         | 14.32          | 54     | 5-145           |      |     |
| 13C12-PCB-019                                   | 2000         | 12.61          | 59     | 5-145           |      |     |
| 13C12-PCB-037                                   | 2000         | 18.26          | 59     | 5-145           |      |     |
| 13C12-PCB-054                                   | 2000         | 14.46          |        | 5-145           |      |     |
| 13C12-PCB-081                                   | 2000         | 21.82          |        | 10-145          |      |     |
| 13C12-PCB-077                                   | 2000         | 22.12          |        | 10-145          |      |     |
| 13C12-PCB-104                                   | 2000         | 17.50          |        | 10-145          |      |     |
|                                                 |              |                |        |                 |      |     |
| 13C12-PCB-123                                   | 2000         | 23.08          |        | 10-145          |      |     |
| 13C12-PCB-118                                   | 2000         | 23.25          |        | 10-145          |      |     |
| 13C12-PCB-114                                   | 2000         | 23.55          |        | 10-145          |      |     |
| 13C12-PCB-105                                   | 2000         | 23.91          |        | 10-145          |      |     |
| 13C12-PCB-126                                   | 2000         | 25.51          |        | 10-145          |      |     |
| 13C12-PCB-155                                   | 2000         | 20.48          |        | 10-145          |      |     |
| 13C12-PCB-167                                   | 2000         | 26.38          |        | 10-145          |      |     |
| 13C12-PCB-156/157                               | 4000         | 27.02          |        | 10-145          |      |     |
| 13C12-PCB-169                                   | 2000         | 28.69          |        | 10-145          |      |     |
| 13C12-PCB-188                                   | 2000         | 23.48          | 59     | 10-145          |      |     |
| 13C12-PCB-189                                   | 2000         | 29.95          | 77     | 10-145          |      |     |
| 13C12-PCB-202                                   | 2000         | 26.26          |        | 10-145          |      |     |
| 13C12-PCB-205                                   | 2000         | 31.33          |        | 10-145          |      |     |
| 13C12-PCB-208                                   | 2000         | 29.67          |        | 10-145          |      |     |
| 13C12-PCB-206                                   | 2000         | 32.39          |        | 10-145          |      |     |
| 13C12-PCB-209                                   | 2000         | 33.50          |        | 10-145          |      |     |
| Cleanup Standards                               |              |                |        |                 |      |     |
|                                                 |              |                |        |                 |      |     |
|                                                 |              |                |        |                 |      |     |
| 13C12-PCB-028                                   | 2000         | 16.00          |        | 5-145           |      |     |
| 13C12-PCB-028<br>13C12-PCB-111<br>13C12-PCB-178 | 2000<br>2000 | 16.00<br>22.01 |        | 5-145<br>10-145 |      |     |

#### **ALS Life Sciences Laboratory Method Blank Analysis Report** Method Blank Sampling Date ALS Sample ID WG3440853-4 Extraction Date 25-Nov-20 Approved: Analysis Method EPA 1668C Sample Size Blank E. Sabljic Analysis Type Blank Percent Moisture n/a --e-signature--Sample Matrix Split Ratio 01-Dec-2020 Reagent **Run Information** Run 1 Filename 5-201130B22 01-Dec-20 01:00 Run Date Final Volume 25 Dilution Factor 1 pg Instrument - Column HRMS-5 SPBOCTYL256001-01 TEF Ret. Conc. EDL EMPC **Target Analytes** (WHO 2005) Time pg pg Flags LQL Homologue Group Totals Total MonoCB 5.60 0.44 200 Total DiCB 26.2 400 1.6 Total TriCB 9.70 0.77 400 Total TetraCB Total PentaCB 14.9 4.87 0.39 800 800 0.70 Total HexaCB 5.81 Total HeptaCB < 0.48 0.48 400 Total OctaCB < 0.67 0.67 U 400 Total NonaCB <2.3 200 DecaCB 112 8.0 200 Total PCB 179 1600 Toxic Equivalency - (WHO 2005) Lower Bound PCB TEQ 0.00 Mid Point PCB TEO 0.0901 Upper Bound PCB TEQ 0.180 EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample. TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency

Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

Indicates that the analyte was positively identifed. The associated numerical result is an estimate.

Indicates that a peak has been manually integrated.

Indicates that this compound was not detected above the EDL.

LQL M

U

EMPC

#### **Laboratory Control Sample Analysis Report**

Sample Name Laboratory Control Sample ALS Sample ID WG3440853-2 Analysis Method EPA 1668C Analysis Type

LCS QC

Sampling Date Extraction Date 25-Nov-20 Sample Size

Percent Moisture n/a Split Ratio

n/a

Approved: E. Sabljic --e-signature--01-Dec-2020

Sample Matrix

Filename 5-201130B19 Run Date 30-Nov-20 22:53 Final Volume 25 ul Dilution Factor 1 % Rec Analysis Units

HRMS-5 SPBOCTYL256001-01 Instrument - Column

|                                                                                                                                                                                                              |                                                              | Ret.                                                                                            | a                                                               | Limits                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| arget Analytes                                                                                                                                                                                               | pg                                                           | Time                                                                                            | % Rec                                                           | Flags                                                                                                      |
| PCB-001                                                                                                                                                                                                      | 1000                                                         | 8.95                                                                                            | 109                                                             | 60-135                                                                                                     |
| PCB-003                                                                                                                                                                                                      | 1000                                                         | 10.49                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-004                                                                                                                                                                                                      | 1000                                                         | 10.65                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-015                                                                                                                                                                                                      | 1000                                                         | 14.34                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-019                                                                                                                                                                                                      | 1000                                                         | 12.64                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-037                                                                                                                                                                                                      | 1000                                                         | 18.28                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-054                                                                                                                                                                                                      | 1000                                                         | 14.49                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-081                                                                                                                                                                                                      | 1000                                                         | 21.84                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-077                                                                                                                                                                                                      | 1000                                                         | 22.15                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-104                                                                                                                                                                                                      | 1000                                                         | 17.53                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-123                                                                                                                                                                                                      | 1000                                                         | 23.10                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-118                                                                                                                                                                                                      | 1000                                                         | 23.27                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-114                                                                                                                                                                                                      | 1000                                                         | 23.59                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-105                                                                                                                                                                                                      | 1000                                                         | 23.94                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-126                                                                                                                                                                                                      | 1000                                                         | 25.53                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-155                                                                                                                                                                                                      | 1000                                                         | 20.51                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-167                                                                                                                                                                                                      | 1000                                                         | 26.42                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-156/157                                                                                                                                                                                                  | 2000                                                         | 27.04                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-169<br>PCB-188                                                                                                                                                                                           | 1000<br>1000                                                 | 28.71<br>23.50                                                                                  |                                                                 | 60-135<br>60-135                                                                                           |
|                                                                                                                                                                                                              |                                                              |                                                                                                 |                                                                 |                                                                                                            |
| PCB-189<br>PCB-202                                                                                                                                                                                           | 1000                                                         | 29.96<br>26.28                                                                                  |                                                                 | 60-135                                                                                                     |
|                                                                                                                                                                                                              | 1000                                                         |                                                                                                 |                                                                 | 60-135                                                                                                     |
| PCB-205<br>PCB-208                                                                                                                                                                                           | 1000<br>1000                                                 | 31.35<br>29.69                                                                                  |                                                                 | 60-135<br>60-135                                                                                           |
| PCB-206                                                                                                                                                                                                      | 1000                                                         | 32.41                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-209                                                                                                                                                                                                      | 1000                                                         | 33.54                                                                                           |                                                                 | 60-135                                                                                                     |
| PCB-209                                                                                                                                                                                                      | 1000                                                         | 33.34                                                                                           | 131                                                             | 00-133                                                                                                     |
| Extraction Standards                                                                                                                                                                                         |                                                              | Time                                                                                            | % Rec                                                           | Limits                                                                                                     |
|                                                                                                                                                                                                              |                                                              |                                                                                                 |                                                                 |                                                                                                            |
| 13C12-PCB-001                                                                                                                                                                                                | 2000                                                         | 8.94                                                                                            | 58                                                              | 15-145                                                                                                     |
| 13C12-PCB-003                                                                                                                                                                                                | 2000                                                         | 10.48                                                                                           |                                                                 | 15-145                                                                                                     |
| 13C12-PCB-004                                                                                                                                                                                                | 2000                                                         | 10.63                                                                                           |                                                                 | 15-145                                                                                                     |
| 13C12-PCB-015                                                                                                                                                                                                | 2000                                                         | 14.33                                                                                           | 54                                                              | 15-145                                                                                                     |
| 13C12-PCB-019                                                                                                                                                                                                | 2000                                                         | 12.62                                                                                           |                                                                 | 15-145                                                                                                     |
| 13C12-PCB-037                                                                                                                                                                                                | 2000                                                         | 18.27                                                                                           |                                                                 | 15-145                                                                                                     |
| 13C12-PCB-054                                                                                                                                                                                                | 2000                                                         | 14.47                                                                                           | 84                                                              | 15-145                                                                                                     |
| 13C12-PCB-081                                                                                                                                                                                                | 2000                                                         | 21.83                                                                                           |                                                                 | 40-145                                                                                                     |
| 13C12-PCB-077                                                                                                                                                                                                | 2000                                                         | 22.14                                                                                           | 63                                                              | 40-145                                                                                                     |
| 13C12-PCB-104                                                                                                                                                                                                | 2000                                                         | 17.51                                                                                           | 67                                                              | 40-145                                                                                                     |
| 13C12-PCB-123                                                                                                                                                                                                | 2000                                                         | 23.09                                                                                           | 63                                                              | 40-145                                                                                                     |
| 13C12-PCB-118                                                                                                                                                                                                | 2000                                                         | 23.26                                                                                           | 58                                                              | 40-145                                                                                                     |
| 13C12-PCB-114                                                                                                                                                                                                | 2000                                                         | 23.58                                                                                           | 60                                                              | 40-145                                                                                                     |
|                                                                                                                                                                                                              | 2000                                                         | 23.93                                                                                           | 61                                                              | 40-145                                                                                                     |
| 13C12-PCB-105                                                                                                                                                                                                | 2000                                                         |                                                                                                 | 75                                                              | 40-145                                                                                                     |
| 13C12-PCB-105<br>13C12-PCB-126                                                                                                                                                                               | 2000                                                         | 25.52                                                                                           | /5                                                              | 40-145                                                                                                     |
|                                                                                                                                                                                                              |                                                              | 25.52<br>20.49                                                                                  |                                                                 | 40-143                                                                                                     |
| 13C12-PCB-126                                                                                                                                                                                                | 2000                                                         |                                                                                                 | 50                                                              | 40-145                                                                                                     |
| 13C12-PCB-126<br>13C12-PCB-155                                                                                                                                                                               | 2000<br>2000                                                 | 20.49                                                                                           | 50<br>86                                                        |                                                                                                            |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167                                                                                                                                                              | 2000<br>2000<br>2000                                         | 20.49<br>26.40                                                                                  | 50<br>86<br>98                                                  | 40-145                                                                                                     |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-156/157                                                                                                                                         | 2000<br>2000<br>2000<br>4000                                 | 20.49<br>26.40<br>27.03                                                                         | 50<br>86<br>98<br>92                                            | 40-145<br>40-145                                                                                           |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-156/157<br>13C12-PCB-169                                                                                                                        | 2000<br>2000<br>2000<br>4000<br>2000                         | 20.49<br>26.40<br>27.03<br>28.70                                                                | 50<br>86<br>98<br>92<br>59                                      | 40-145<br>40-145<br>40-145                                                                                 |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-156/157<br>13C12-PCB-169<br>13C12-PCB-188                                                                                                       | 2000<br>2000<br>2000<br>4000<br>2000<br>2000                 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49                                                       | 50<br>86<br>98<br>92<br>59<br>102                               | 40-145<br>40-145<br>40-145<br>40-145                                                                       |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-156/157<br>13C12-PCB-169<br>13C12-PCB-188<br>13C12-PCB-189                                                                                      | 2000<br>2000<br>2000<br>4000<br>2000<br>2000                 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96                                              | 50<br>86<br>98<br>92<br>59<br>102<br>97                         | 40-145<br>40-145<br>40-145<br>40-145<br>40-145                                                             |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-167/157<br>13C12-PCB-169<br>13C12-PCB-189<br>13C12-PCB-189<br>13C12-PCB-202                                                                     | 2000<br>2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27                                     | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75                   | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145                                                   |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-167<br>13C12-PCB-169<br>13C12-PCB-188<br>13C12-PCB-189<br>13C12-PCB-202                                                                         | 2000<br>2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34                            | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75                   | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145                                         |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-169<br>13C12-PCB-169<br>13C12-PCB-189<br>13C12-PCB-202<br>13C12-PCB-202<br>13C12-PCB-205                                                        | 2000<br>2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34<br>29.68                   | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75<br>54             | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145                               |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-169<br>13C12-PCB-169<br>13C12-PCB-188<br>13C12-PCB-189<br>13C12-PCB-202<br>13C12-PCB-205<br>13C12-PCB-206<br>13C12-PCB-206                      | 2000<br>2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34<br>29.68<br>32.40          | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75<br>54             | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145                     |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-1567<br>13C12-PCB-156/157<br>13C12-PCB-169<br>13C12-PCB-189<br>13C12-PCB-189<br>13C12-PCB-202<br>13C12-PCB-205<br>13C12-PCB-208                                  | 2000<br>2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34<br>29.68<br>32.40          | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75<br>54             | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145                     |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-169/157<br>13C12-PCB-169<br>13C12-PCB-189<br>13C12-PCB-189<br>13C12-PCB-202<br>13C12-PCB-205<br>13C12-PCB-206<br>13C12-PCB-206<br>13C12-PCB-206 | 2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34<br>29.68<br>32.40<br>33.51 | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75<br>54<br>77       | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145           |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-167<br>13C12-PCB-169<br>13C12-PCB-188<br>13C12-PCB-189<br>13C12-PCB-202<br>13C12-PCB-205<br>13C12-PCB-206<br>13C12-PCB-206<br>13C12-PCB-206     | 2000<br>2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34<br>29.68<br>32.40<br>33.51 | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75<br>54<br>77<br>30 | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145 |
| 13C12-PCB-126<br>13C12-PCB-155<br>13C12-PCB-167<br>13C12-PCB-169/157<br>13C12-PCB-169<br>13C12-PCB-189<br>13C12-PCB-189<br>13C12-PCB-202<br>13C12-PCB-205<br>13C12-PCB-206<br>13C12-PCB-206<br>13C12-PCB-206 | 2000<br>2000<br>4000<br>2000<br>2000<br>2000<br>2000<br>2000 | 20.49<br>26.40<br>27.03<br>28.70<br>23.49<br>29.96<br>26.27<br>31.34<br>29.68<br>32.40<br>33.51 | 50<br>86<br>98<br>92<br>59<br>102<br>97<br>75<br>54<br>77<br>30 | 40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145<br>40-145           |

Chain of Custody (COC) / Analytical

Request Form

Canada Toll Free: 1 800 668 9878

ALS) Environmental

2526958-COFC

000 Number 17 - 792336

Page

图口 Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) SAMPLES ON HOLD Same Day, Weekend or Statutory holiday [E2 -200% FINAL COOLER TEMPERATURES & au au ŧ £ dd-mmm-yy hh:mm Standard TAT if received by 3 pm - business days - no surcharges apply FINAL SHIPMENT RECEPTION (lab use office) (Laboratory opening fees may apply) SAMPLE CONDITION AS RECEIVED (lab use only) Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below 口囟 or tests that can not be performed according to the service level selected, you will be contacted 1 Business day [E - 100%] **Analysis Request** Custody seal intact Date and Time Required for all E&P TATS K Ice Cubes Regular [R] 🗡 Received by: 4 day [P4-20%] 3 day [P3-25%] 图 2 day [P2-50%] MOUND TO BUD Cooling Initiated Time: 13:50 %.y. €.y. ce Packs Frozen NUMBER OF CONTAINERS Email 1 or Fax SV IVable (artox Grandale C. W. wipe Email 1 or Fax SVIVANCO/A-ToxSTAKGIES.CM N P AND BOOK NA SE 8 Ž Sample Type Nipp NIPE STATE OF S S Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only) INITIAL SHIPMENT RECEPTION (lab use only) Quality Control (QC) Report with Report | X vest | X ED (DISTIAL) Compare Results to Criteria on Report - provide details below if box checked Select Distribution: Bath - Nov. Zone X EMAIL 🗍 MAIL 🗍 FAX Oil and Gas Required Fields (client use) Routing Code: Report Format / Distribution (hh:mm) Time Invoice Distribution Sampler: 302/20/ 0202/140/ 07002/00/11 11/03/2020 1/03/2020 1/03/120 0291 160/ proc/Poli 1/04/1020 11/63/2020 202/606 1/04/2020 Perro Select Invoice Distribution: Received by Aajor/Minor Code ALS Contact: Requisitioner: AFE/Cost Center: Location Email 2 Email 3 Email 2 Date: 1)/02/2020 [600] ALS 6020-283 Sample Identification and/or Coordinates (This description will appear on the report) 260 Contact and company name below will appear on the final repor VES NO Company address below will appear on the final report 27001 La Par Rd Suite ENG-558- DFP-02 ENG-558-0FP-0 583 -0FP-02 ENG-583-DFP-0 DFP- BLANK SHIPMENT RELEASE (client use) Stophanie VIVanio Mission vieto CA 649-382-1524 Project Information 13A-3-Blank Drinking Water (DW) Samples1 (client use) re samples taken from a Regulated DW System? Ox Stratal Copy of Invoice with Report www.alsglobal.com ALS Lab Work Order # (lab use only): Are samples for human consumption! use? 356-4 356-4 Same as Report To D-70 139-₩ **X** SEX ALS Account # / Quote #: ALS Semple \* (Reb use only) Sity/Province: Released by: Postal Code œ 10 Ξ ک nvoice To 5 Report To Company: Ġ PO / AFE: Sompany Ч 3 7 Contact Contact: Phone: Street: Job #: ŝ

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

## **ATTACHMENT 2**

# PCB TEQ, Non-TEQ PCB, and Dioxin/Furan TEQ Calculations

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |          |                      | BA-1    |                     |          |              | BA-2                                  |       |          | BA-3         | BA-3-BLANK |         |                | 356-4       |       |              | 356            | -5-             |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------|----------------------|---------|---------------------|----------|--------------|---------------------------------------|-------|----------|--------------|------------|---------|----------------|-------------|-------|--------------|----------------|-----------------|------------|
| 1.   1.   1.   1.   1.   1.   1.   1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sample Name     |          |                      |         |                     |          | CBs          |                                       |       |          |              |            | PCB TEQ |                |             |       |              |                | Non-TEQ<br>PCBs | PCB TEQ    |
| 1.   1.   1.   1.   1.   1.   1.   1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | <u> </u> | ( <b>P9)</b><br>-5.0 | T       |                     | ) III)   | (P9)<br>-3.2 | ╁                                     | -     | 3        | .28          | 2.3E-08    |         | -2             | t           |       | 6d)          |                | 1.6E-08         | (hg/ciii ) |
| 1.   1.   1.   1.   1.   1.   1.   1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-002         |          | -6.47                |         | -6.5E-08            |          | 7.71         | 7                                     | 7E-08 |          | 3.29         | 3.3E-08    |         | -2.43          | -2.4        | E-08  | -1.3         | 3              | -1.3E-08        |            |
| 1.   1.   1.   1.   1.   1.   1.   1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-003         |          | -7.9                 |         | -7.9E-08            |          | -8.07        | ۱ م                                   | 1E-08 | _        | 1.51         | 4.5E-08    |         | -3.73          | -3.7        | E-08  | -2.5         | 2              | -2.5E-08        |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-004         |          | 0000                 |         | 7.3E-08             |          | 7.11         | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 1E-08 |          | -3.4         | -3.4E-08   |         | -2.2           | -2.2        | E-08  | -2.8         | x              | -2.8E-08        |            |
| Column   C | PCB-009         |          | -0.99                |         | 9.9E-09             |          | -1.6         | 7                                     | 6E-08 |          | -2.3         | -2.3E-08   |         | 4:1-           | -1.4        | E-08  | 1.5          | 2              | -1.5E-08        |            |
| Control   Cont | PCB-007         |          | 7.12                 |         | 7.1E-08             |          | 17.3         | 1                                     | 7E-07 |          | -2.2         | -2.2E-08   |         | -1.3           | -1.3        | E-08  | -1.4         | 4              | -1.4E-08        |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-006         |          | -8.3                 |         | -8.3E-08            |          | 10.1         |                                       | 0E-07 |          | -2.3         | -2.3E-08   |         | 4.1-           | -1.4        | E-08  | 7.           | 2              | -1.5E-08        |            |
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PCB-005         |          | -1.6                 |         | -1.6E-08            |          | -1.9         |                                       | 9E-08 |          | -2.6         | -2.6E-08   |         | -1.6           | -1.6        | E-08  | -1.7         | 7              | -1.7E-08        |            |
| 15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10.         15.50.10. <t< td=""><td>PCB-000</td><td></td><td>-0.92</td><td></td><td>-9.2E-09</td><td></td><td>-1.5</td><td></td><td>9E-07</td><td></td><td>-2.9</td><td>-2.1E-00</td><td></td><td>-1.7</td><td>-1.7</td><td>E-08</td><td>0.0-<br/>-</td><td>2</td><td>-0.0E-00</td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-000         |          | -0.92                |         | -9.2E-09            |          | -1.5         |                                       | 9E-07 |          | -2.9         | -2.1E-00   |         | -1.7           | -1.7        | E-08  | 0.0-<br>-    | 2              | -0.0E-00        |            |
| 1871   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872   1872    | PCB-011         |          | 329                  |         | 3.3E-06             |          | 445          | 4                                     | 5E-06 |          | 46           | 4.6E-07    |         | -69.1          | -6.9        | E-07  | 9.77-        | 9              | -7.8E-07        |            |
| PRESENTA         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         186         18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PCB-012/013     |          | 22.7                 |         | 2.3E-07             |          | 20.1         | 2                                     | 0E-07 |          | -3           | -3.0E-08   |         | -1.8           | -1.8        | E-08  | -5           | 2              | -2.0E-08        |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-015         |          | 24.5                 |         | 2.5E-07             |          | -9.4         | 6-                                    | 4E-08 |          | -3.6         | -3.6E-08   |         | -3.6           | -3.6        | E-08  | -2.4         | 4              | -2.4E-08        |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-019         |          | -1.3                 |         | -1.3E-08            |          | 2.93         | 2                                     | 9E-08 |          | -1.3         | -1.3E-08   |         | L- 1           | -1.0        | E-08  | -1.1         |                | -1.1E-08        |            |
| PREMENTAL         CREATION         CREATION         CREATION         CREATION         CATALON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PCB-018/030     |          | 16.3                 |         | 1.6E-07             |          | 7.34         | 7                                     | /E-0/ |          | 4 4          | -4.0E-08   |         | 7.35           | 2.0         | E-08  | 8.54         | 4              | 8.5E-08         |            |
| PPENDING         4.25         6.25         4.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PCB-027         |          | -0.62                |         | 6.7E-09             |          | 1.1-         |                                       | 3E-08 |          | -1.0         | -1.0E-08   |         | -0.85          | 200         | E-09  |              |                | -1.1E-08        |            |
| Pubbers   Pubb | PCB-024         |          | -0.52                |         | -5.2E-09            |          | -1.1         | -                                     | 1E-08 |          | -1.2         | -1.2E-08   |         | -0.85          | -8.5        | E-09  | -1.1         | _              | -1.1E-08        |            |
| Pubblicies   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4,45   4 | PCB-016         |          | 7.9                  |         | 7.9E-08             |          | 8-           | 8-                                    | 0E-08 |          | -1.9         | -1.9E-08   |         | 3.38           | 3.4         | E-08  | 7-           | 4              | -4.0E-08        |            |
| PREADURY         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056         0.056                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | PCB-032         |          | 4.43                 |         | 4.4E-08             |          | 4.4          | 4                                     | 4E-08 |          | -1.1         | -1.1E-08   |         | 2.32           | 2.3         | E-08  | 2.58         | 8              | 2.6E-08         |            |
| CREATION         3.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15         1.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PCB-034         |          | -0.65                |         | -6.5E-09            |          | 1.1          | -                                     | 1E-08 |          | -1.3         | -1.3E-08   |         | <u>+</u>       | 1.1         | E-08  | 4; -         | 2              | -1.5E-08        |            |
| PRENDENTIAL         2.5         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6 <th< td=""><td>PCB-023</td><td></td><td>-0.61</td><td></td><td>-6.1E-09</td><td></td><td>1-07 /</td><td></td><td>0E-08</td><td></td><td>1.2</td><td>-1.2E-08</td><td></td><td>-1</td><td>-1.(</td><td>E-08</td><td>7.1-</td><td>4</td><td>-1.4E-08</td><td></td></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | PCB-023         |          | -0.61                |         | -6.1E-09            |          | 1-07 /       |                                       | 0E-08 |          | 1.2          | -1.2E-08   |         | -1             | -1.(        | E-08  | 7.1-         | 4              | -1.4E-08        |            |
| PRD-1000         312         316.00         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16         1.16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PCB-028/028     |          | -2.5                 |         | -3.3E-08            |          | 1.94         | 1 ~                                   | 9E-08 |          | -1.1         | -1.7E-08   |         | -0.91          | -9.1        | E-09  | 4 65         | 3 +            | -1.4E-06        |            |
| 90.2010.00         90.2010.00         90.2010.00         1.20 cm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PCB-031         |          | 28.7                 |         | 2.9E-07             |          | -19          | -                                     | 9E-07 |          | 7.47         | 7.5E-08    |         | -12.9          | 1-          | E-07  | -11          |                | -1.1E-07        |            |
| PDE-01/20         7.10         1.46.70         6.22         0.22         0.22.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.00         1.76.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PCB-020/028     |          | 34.2                 |         | 3.4E-07             |          | 23.3         | 2                                     | 3E-07 |          | -1.2         | -1.2E-08   |         | 1-             | -1.0        | E-08  | -1,4         | 4              | -1.4E-08        |            |
| PDE-BASING         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-021/033     |          | 20.9                 |         | 2.1E-07             |          | -14          | ·                                     | 4E-07 |          | 5.22         | 5.2E-08    |         | -10.2          | -1.0        | E-07  | -8.53        | m c            | -8.5E-08        |            |
| PDE-05030         4 JC 20         4 JC 20         1 JC 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-022         |          | 12.8                 |         | 1.3E-U/             |          | 9.68         | D 1                                   | /E-08 |          | -7.2         | -2.0E-08   |         | 5.57           | 5.6         | E-08  | 5.77         | 7 7            | 5.2E-08         |            |
| PCB-020         11         11E-09         1.3         1.15-09         1.1         1.1E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PCB-039         |          | -0.62                |         | -6.2E-09            |          |              | -                                     | 0E-08 |          | -1.2         | -1.2E-08   |         | <del>, ,</del> | -1.0        | E-08  | -1.4         | + 4            | -1.4E-08        |            |
| PCE-BOOK         11         11 EE/T         912         912 BE-BOR         -14         -14 EE/BOR         -12         7 BE-BOR         -14         -14 EE/BOR         -12         7 BE-BOR         -14         -14 EE/BOR         -12         7 BE-BOR         -34         -12 BE-BOR         -34         -12 BE-BOR         -34         -12 BE-BOR         -34         -34 EE/BOR         -34 E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PCB-038         |          | -0.67                |         | -6.7E-09            |          | -1.1         | -1                                    | 1E-08 |          | -1.3         | -1.3E-08   |         | -1.1           | -1.1        | E-08  | -1.5         | 5              | -1.5E-08        |            |
| PD64001         228         25E47         73E         73E408         43         35E408         43E408                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PCB-035         |          | 11.1                 |         | 1.1E-07             |          | 9.12         | 6                                     | 1E-08 |          | -1.4         | -1.4E-08   |         | -1.2           | -1.2        | E-08  | -1.6         | 9              | -1.6E-08        |            |
| 2.8.1         2.8.2.0         3.2.2.0         3.2.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0         4.3.2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-037         |          | 22.9                 |         | 2.3E-07             |          | -7.8         | -7                                    | 8E-08 |          | ကု           | -3.0E-08   |         | 7.81           | 7.8         | E-08  | -3.4         | 4 1            | -3.4E-08        |            |
| SACKARATION         S.22         CAREAD         CARE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PCB-054         |          | -0.26                |         | -2.6E-09            |          | -0.35        | ကု                                    | 5E-09 | Υ<br>    | 1.58         | -5.8E-09   |         | -0.44          | 4.4         | E-09  | -0.55        | 2              | -5.5E-09        |            |
| PDE-DEGAME         3.02         9.02 E-0.0         9.02 E-0.0 <td>PCB-030/033</td> <td></td> <td>5.01</td> <td></td> <td>5.0E-U0<br/>5.0E-U0</td> <td></td> <td>3.32</td> <td>0 +</td> <td>0E-00</td> <td></td> <td>-1.5</td> <td>2 1E-08</td> <td></td> <td>-0.35</td> <td>-2.6</td> <td>E-03</td> <td>0.992</td> <td>7 8</td> <td>9.9E-09</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-030/033     |          | 5.01                 |         | 5.0E-U0<br>5.0E-U0  |          | 3.32         | 0 +                                   | 0E-00 |          | -1.5         | 2 1E-08    |         | -0.35          | -2.6        | E-03  | 0.992        | 7 8            | 9.9E-09         |            |
| PCB-0122         35 G         37 E         32 G         32 E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PCB-045         |          | -0.92                |         | 9.2E-09             |          | 1.1          | 7                                     | 1E-08 |          | -1.8         | -1.8E-08   |         | -0.82          | -8.2        | E-09  | 76:0-        | 2 2            | -9.7E-09        |            |
| PDE-01/2         4.3         1.0E-09         4.0         1.0E-09         4.0         1.0E-09         4.0         4.0E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PCB-052         |          | 36.5                 |         | 3.7E-07             |          | 32.3         | 3                                     | 2E-07 |          | -5.2         | -5.2E-08   |         | 8.53           | 8.5         | E-08  | 9.7-         | 9              | -7.6E-08        |            |
| PCD-0443         4 I         1 GE 08         1 3         1 3E 08         2 5E 08         3 5E 08         4 3E 08         4 1 E 08 </td <td>PCB-073</td> <td></td> <td>-0.3</td> <td></td> <td>-3.0E-09</td> <td></td> <td>-0.74</td> <td>2-</td> <td>4E-09</td> <td></td> <td>-1.2</td> <td>-1.2E-08</td> <td></td> <td>-0.54</td> <td>-5.4</td> <td>E-09</td> <td>-0.64</td> <td>4</td> <td>-6.4E-09</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | PCB-073         |          | -0.3                 |         | -3.0E-09            |          | -0.74        | 2-                                    | 4E-09 |          | -1.2         | -1.2E-08   |         | -0.54          | -5.4        | E-09  | -0.64        | 4              | -6.4E-09        |            |
| PCB-M300         41         1.25         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         4.55         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-043         |          | 1-                   |         | -1.0E-08            |          | -1.3         | 7                                     | 3E-08 | Ì        | -2           | -2.0E-08   |         | -0.93          | 6.6-        | E-09  | -1.1         | - 0            | -1.1E-08        |            |
| 4028         4028         41E-07         65E-07         64E-08         64E-08         67E-08         67E-08         67E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PCB-049/069     |          | 0.4                  |         | 1.3E-U/             |          | 4.58         | - 4                                   | ZE-07 | 1        | -1.6         | 2.0E-U8    |         | -3.8<br>0.1    | 3.0         | E-08  | 2.5.<br>0.0- | 7 0            | -3.2E-U8        |            |
| PCB-002         -12         -12E-0         -12E-0 <td>PCB-044/047/065</td> <td></td> <td>40.8</td> <td></td> <td>4.1E-07</td> <td></td> <td>58.7</td> <td>1 2</td> <td>9E-07</td> <td></td> <td>-6.4</td> <td>-6.4E-08</td> <td></td> <td>-9.65</td> <td>-9.7</td> <td>E-08</td> <td>-8.19</td> <td>0</td> <td>-8.2E-08</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-044/047/065 |          | 40.8                 |         | 4.1E-07             |          | 58.7         | 1 2                                   | 9E-07 |          | -6.4         | -6.4E-08   |         | -9.65          | -9.7        | E-08  | -8.19        | 0              | -8.2E-08        |            |
| PCEGORY         64         64/E-08         584         584-08         584-08         584-08         584-08         18E-08         199         20-08         199         20-08         199         20-08         199         20-08         199         20-08         199         20-08         199         20-08         199         20-08         199         20-08         199         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-08         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09         20-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-059/062/075 |          | -2.2                 |         | -2.2E-08            |          | -1.8         | -1                                    | 8E-08 |          | -1.2         | -1.2E-08   |         | -0.56          | -5.6        | E-09  | 99:0-        | 9              | -6.6E-09        |            |
| PCB-0172         1.5E-01         1.1E-01         1.1E-01         1.1E-01         1.1E-02         2.5E-08         3.2E-08         4.5D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-042         |          | -6.4                 |         | -6.4E-08            |          | 5.84         | 2                                     | 8E-08 |          | -1.8         | -1.8E-08   |         | 1.99           | 2.0         | E-08  | -1.9         | 6              | -1.9E-08        |            |
| PCB-072         -0.57         -0.57         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         -0.52         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PCB-040/041/0/1 |          | 18.5                 |         | 1./E-0/<br>1.3E-07  |          | 11.8         | - 0                                   | ZE-07 |          | 2.T-         | -1.8E-08   |         | 3.22           | 4.4         | E-08  | 97.6         | 2 8            | 4.8E-08         |            |
| PCB-068         4.12         4.1E-08         1.0E-08        08E-09        076        076        076        078        078        08E-09        078        08E-09        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        089        079 <td>PCB-034</td> <td></td> <td>-0.57</td> <td></td> <td>1.3L-07<br/>-5.7E-09</td> <td></td> <td>-0.94</td> <td>n 0-</td> <td>4E-09</td> <td>ļ</td> <td>2-2</td> <td>-2.0L-06</td> <td></td> <td>-0.65</td> <td>9.6<br/>-6.5</td> <td>E-09</td> <td>-0.83</td> <td>3 0</td> <td>-8.3E-09</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PCB-034         |          | -0.57                |         | 1.3L-07<br>-5.7E-09 |          | -0.94        | n 0-                                  | 4E-09 | ļ        | 2-2          | -2.0L-06   |         | -0.65          | 9.6<br>-6.5 | E-09  | -0.83        | 3 0            | -8.3E-09        |            |
| PCB-067         -0.61         -6.1E-09         -1         -1.0E-08         -0.98         -9.8E-09         -0.69         -6.9E-09         -0.69         -6.9E-09         -0.69         -6.9E-09         -0.69         -6.9E-09         -0.69         -6.9E-09         -0.09         -6.9E-09         -0.09         -6.9E-09         -0.09         -0.09         -6.9E-09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09         -0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-068         |          | 4.12                 |         | 4.1E-08             |          | 10.6         | -                                     | 1E-07 | Ÿ        | 98.0         | -8.6E-09   |         | -0.7           | -7.0        | E-09  | -0.78        | 8              | -7.8E-09        |            |
| PCB-067         -0.53         -0.52-09         -0.54         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.64         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62         -0.62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PCB-057         |          | -0.61                |         | -6.1E-09            |          | 7- 2         | 7                                     | 0E-08 | 7        | 98.0         | -9.8E-09   |         | -0.69          | 99          | 60-1  | 0.80         | 0 1            | -8.9E-09        |            |
| PCB-063        5.6E-09        0.33        0.51        0.51        5.1E-09        0.64        0.64        0.64        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62        0.62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PCB-038         |          | -0.55                |         | -5.5E-09            |          | -0.91        | ဂု တု                                 | 1E-09 | 7 7      | 82           | -8.9E-09   |         | -0.58          | 9.5         | E0-13 | -0.8         | - 2            | -8.1E-09        |            |
| PCB-0056         S 26         S 22         S 26-07         S 35-07         S 36-07         S 36-08         S 36-08         T 06-08         T 06-09         T 06-09         T 06-09         T 06-09         T 10-09         T 06-09         T 10-09         T 06-09         T 06-09         T 10-09         T 06-09         T 06-09         T 06-09         T 10-09         T 06-09         T 06-09         T 10-09         T 06-09         T 10-09         T 10-09         T 10-09         T 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |          | -0.56                |         | -5.6E-09            |          | -0.93        | 6-                                    | 3E-09 | )        | 191          | -9.1E-09   |         | -0.64          | -6.4        | E-09  | -0.82        | 2              | -8.2E-09        |            |
| 384         3.8E-0         1.27         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0         1.25-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _               |          | 82                   |         | 8.2E-07             |          | 33.4         | . 3                                   | 3E-07 |          | 3.47         | 6.5E-08    |         | -10.1          | -1.0        | E-07  | -8.4         | 4              | -8.4E-08        |            |
| 26.2         2.6E-07         1.2E-07         3.5E-08         3.5E-08         8.9T         8.9T         8.9E-08         8.4T         8.4E-08         8.4E-08           1.2 6         1.3E-07         3.75         3.8E-08         -0.39         -3.9E-09         1.7         1.7E-08         0.918         9.2E-09           -0.73         -7.3E-09         -0.88         -3.8E-09         -0.99         -8.0E-09         -0.75         -0.76         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.78         -0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PCB-055         |          | 38.4                 |         | 3.8E-U7             |          | 12.7         |                                       | 3E-07 |          | -2.4         | -2.4E-08   |         | -0 71          | -4.0        | E-08  | 27.6         | 0 0            | 5.3E-08         |            |
| 126         1.3E-07         3.75         3.8E-08         -0.99         -0.9E-09         -1.7         1.7E-08         0.918         0.918         9.2E-09           0.053         -6.5E-09         -6.5E-09         -0.61         -6.5E-09         -0.67         -6.5E-09         -0.78         -7.8E-09         -7.8E-09           0.073         -7.3E-09         -0.38         -8.8E-09         -0.91         -0.65         -6.5E-09         -0.67         -6.5E-09         -0.78         -7.6E-09         -7.8E-09         -0.88         -8.8E-09         -8.8E-09         -0.65         -0.65         -0.65         -0.68         -6.5E-09         -0.65         -0.69         -0.88         -0.8E-09         -0.88         -0.88         -0.9E-09         -0.88         -0.8E-09         -0.88         -0.8E-09         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88         -0.88 <td>PCB-056</td> <td></td> <td>26.2</td> <td></td> <td>2.6E-07</td> <td></td> <td>12.3</td> <td>-</td> <td>2E-07</td> <td></td> <td>-3.5</td> <td>-3.5E-08</td> <td></td> <td>8.91</td> <td>8.6</td> <td>E-08</td> <td>8.41</td> <td>) <del>-</del></td> <td>8.4E-08</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PCB-056         |          | 26.2                 |         | 2.6E-07             |          | 12.3         | -                                     | 2E-07 |          | -3.5         | -3.5E-08   |         | 8.91           | 8.6         | E-08  | 8.41         | ) <del>-</del> | 8.4E-08         |            |
| -0.53         -5.8E-09         -0.86         -8.6E-09         -0.6f         -0.6f         -0.78         -7.78E-09         -7.78E-09         -0.78         -7.78E-09         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-060         |          | 12.6                 |         | 1.3E-07             |          | 3.75         | 3                                     | 8E-08 | Ŷ        | 66.0         | -9.9E-09   |         | 1.7            | 1.7         | E-08  | 0.918        | 8              | 9.2E-09         |            |
| -0.73         -7.3E-09         -0.53         -9.5E-09         -0.93         -9.5E-09         -0.5E-09         -0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-080         |          | -0.53                |         | -5.3E-09            |          | -0.88        | φ (                                   | 8E-09 | <u> </u> | 98.0         | -8.6E-09   |         | -0.61          | -6.1        | E-09  | 92.0-        | 8 8            | -7.8E-09        |            |
| 0.0001         113         0.0013         NA         1.3E-19         6.8E-12         -1.3         0.0013         NA         1.3E-19         6.8E-12         -1.3         0.00013         NA         1.3E-19         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-078         |          | -0.73                |         | -7.3E-09            |          | -0.93        | δ                                     | 3E-09 | 7        | 19.1         | -9.1E-09   |         | -0.65          | -7.6        | E-09  | 8.0          | 20 00          | -8.3E-09        |            |
| 0.0003         -0.7         -0.00021         NA         -3.10E-12         -1.3         -0.0003         NA         -3.60E-12         -0.0003         NA         -3.60E-12         -0.0003         NA         -3.60E-12         -0.8         -0.8         -0.8         -0.0003         NA         -3.60E-12         -0.1         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0         -0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PCB-077         | 0.0001   |                      | 4       |                     | .13E-11  |              | 4.                                    | 9     | -12      | -1.3 -0.0001 |            | 1       |                | 4_          | 1     |              | _              | NA<br>NA        | -1.50E-12  |
| -0.38         -3.8E-09         -0.85         -8.5E-09         -0.87         -8.7E-09         -0.87         -8.7E-09         -0.87         -0.99           -0.36         -3.6E-09         -0.95         -9.5E-09         -0.87         -8.7E-09         -0.93         -0.99           -0.72         -7.2E-09         -1.6E-08         -1.5E-08         -0.97         -9.7E-09         -1.1           -0.84         -8.4E-09         -1.9E-08         -1.7         -1.7E-08         -1.1         -1.1E-08         -1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PCB-081         | 0.0003   | $\perp$              | 0.00021 | _                   | :.10E-12 | ш            | ш                                     | ကို   |          | ш            |            |         | щ              | Щ           | -2    |              | H              | ΑN              | -3.30E-12  |
| -0.72         -0.72E-09         -1.6E-08         -1.7E-08         -0.7E-09         -0.7E-09         -1.1           -0.84         -8.4E-09         -1.9         -1.9E-08         -1.7         -1.7E-08         -1.1         -1.1E-08         -1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PCB-104         |          | -0.38                |         | -3.8E-09            |          | -0.85        | φ σ                                   | 5E-09 | 7        | 78.0         | -8.7E-09   |         | -0.87          | 1.89        | E-09  | 0.0          | 6 0            | -9.0E-09        |            |
| -0.84         -8.4E-09         -1.9         -1.1E-08         -1.7         -1.7E-08         -1.1         -1.1E-08         -1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PCB-103         |          | -0.72                | İ       | -7.2E-09            | l        | -1.6         | 7 7                                   | 9E-08 | 1        | -1.5         | -0., L-0.  |         | -0.97          | -9.7        | E-03  | - F          | 1 8            | -3.0L-02        |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB-094         |          | -0.84                |         | -8.4E-09            |          | -1.9         | -                                     | 9E-08 |          | -1.7         | -1.7E-08   |         | 1.1-           | -1.1        | E-08  | -1.3         | 3              | -1.3E-08        |            |

|                             |          |               | BA-1              |                     |           |                       | BA-2                  |                 |           | BA-                              | BA-3-BLANK            |                     |                  | 356             | 4        |           |                  | 356-            | 10                   |           |
|-----------------------------|----------|---------------|-------------------|---------------------|-----------|-----------------------|-----------------------|-----------------|-----------|----------------------------------|-----------------------|---------------------|------------------|-----------------|----------|-----------|------------------|-----------------|----------------------|-----------|
|                             | <u> </u> | _             | -                 | Non-TEQ             | 0.00      | _                     | .—                    | Non-TEQ         | OH and    | 8                                | Non-TEQ               | D TEO               |                  | · III           | Non-TEQ  | 0.00      | _                | ,               | Non-TEQ              | 0.00      |
| Sample Name T               | TEF      | All PCBS P    | PCB IEG<br>(pg) ( | )                   | _         | All PCBS   PC<br>(pg) | РСВ ІЕЦ Г<br>(рд) (µg | )               |           | All PCBS   PCB   EQ<br>(pg) (pg) | (                     |                     | All PCBS<br>(pg) | PCB IEG<br>(pg) | )        |           | All PCBS<br>(pg) | PCB IEQ<br>(pg) | )                    | (µg/cm²)  |
| PCB-095                     |          | 45.3          | H                 | 4.5E-07             |           | 25.8                  | 7                     |                 |           | -2.7                             | -2.7E-08              |                     | 3.63             |                 | 3.6E-08  |           | 5.34             |                 | ~                    |           |
| PCB-093/098/100/102         |          | -2.2          |                   | -2.2E-08            |           | -1.8                  | 7                     | .8E-08          |           | 1.6                              | -1.6E-(               | 800                 | <u>+</u>         |                 | -1.1E-08 |           | -1.2             |                 | -1.2E-08             |           |
| PCB-080/091                 |          | 20.7          |                   | 2.1E-07             |           | 9:36                  |                       | .0E-07          | 1         | -1.9                             | -1.7 E-08<br>-1.9E-08 | 9 8                 | -1.1             |                 | -1.1E-08 |           | - 1.4<br>- 4.1   |                 | -1.4E-08             |           |
| PCB-089                     |          | -1.2          |                   | -1.2E-08            |           | -2.1                  | 3-                    | .1E-08          |           | -1.9                             | -1.9E-C               | 80                  | -1.2             |                 | -1.2E-08 |           | -1.4             |                 | -1.4E-08             |           |
| PCB-121                     |          | 12.0          |                   | -6.1E-09            | 1         | 4.1-                  | 7 0                   | .4E-08          |           | -1.3                             | -1.3E-C               | 80                  | -0.81            |                 | -8.1E-09 |           | -0.93            |                 | -9.3E-09             |           |
| PCB-090/101/113             |          | 13.8          |                   | 1.4E-07             |           | 38.2                  | ~ 6                   | .8E-07          |           | -3.6                             | -1.9E-0               | 20 80               | -1.2             |                 | -1.2E-08 |           | -1.4<br>-6.11    |                 | -1.4E-08             |           |
| PCB-083/099                 |          | 46.5          |                   | 4.7E-07             |           | -16                   | -                     | .6E-07          |           | -1.9                             | -1.9E-C               | 8                   | -2.2             |                 | -2.2E-08 |           | -2.8             |                 | -2.8E-08             |           |
| PCB-112                     |          | -0.64         |                   | -6.4E-09            |           | 1.4                   | 7-10                  | -1.4E-08        |           | -1.3                             | -1.3E-08              | 8(                  | -0.85            |                 | -8.5E-09 |           | 86.0-            |                 | -9.8E-09             |           |
| PCB-086/087/097/109/119/125 |          | 17.1          | 1                 | 7.7E-07             | 1         | 29.6                  |                       | 4F 07           |           | 9.1-                             | -1.6E-C               | 80 0                | 9- 7-0           |                 | -6.0E-08 |           | -1.8             |                 | -1.8E-08             |           |
| PCB-089/110/115/116/11/     |          | 150           |                   | 1.0E-06<br>-1.5F-07 |           | 5.10<br>-6.5          | ۲۹۹                   | 5F-08           | 1         | -3.4                             | -3.4E-08              | 8 8                 | -16              |                 | -1 6F-08 |           | -18              |                 | 8.7E-08              |           |
| PCB-111                     |          | 99:0-         |                   | -6.6E-09            |           | -1.5                  | -                     | -1.5E-08        |           | -1.4                             | -1.4E-08              | 8 8                 | -0.88            |                 | -8.8E-09 |           | 5 -              |                 | -1.0E-08             |           |
| PCB-120                     |          | -0.65         |                   | -6.5E-09            |           | -1.5                  | -                     | .5E-08          |           | -1.4                             | -1.4E-08              | 81                  | -0.87            |                 | -8.7E-09 |           | 7                |                 |                      |           |
| PCB-108/124                 |          | 5.09          |                   | 5.1E-08             |           | 7 -2                  | ,7 7                  | -2.0E-08        |           | -1.5                             | -1.5E-08              | 800                 | -1.2             |                 | -1.2E-08 |           | -<br>-<br>-<br>- |                 | -1.5E-08             |           |
| 1.0                         | 0.00003  | 54.3          | 0.001629          | -0.0E-U8            | 1.63E-11  | -17                   | -0.00051              | _               | -5.10E-12 | -1.3<br>-1.6 -4.8E-0             | -1.3E                 | -08<br>NA -4.80E-13 | 3.33             | 9.99E-05        | -1.1E-08 | 9.99E-13  | 5.1-             | -5.1E-05        | _                    | -5.10E-13 |
|                             |          |               |                   | -1.2E-08            |           |                       |                       |                 | !         |                                  | -1.5E                 | _                   | -1.3             |                 | -1.3E-08 | 1         | -1.6             | 3               |                      |           |
|                             | 0.00003  |               | 0.000102          | NA                  | 1.02E-12  |                       | -6.6E-05              |                 | -6.60E-13 | -1.5 -4.5E-05                    |                       | NA -4.50E-13        | -1.3             | -3.9E-05        | -        | -3.90E-13 | -1.6             | -4.8E-05        |                      | -4.80E-13 |
|                             |          | 2.44          |                   |                     |           |                       | _                     |                 |           |                                  | -1.6E                 |                     |                  |                 |          |           | -1.7             |                 | -1.7E-08             |           |
| PCB-118 0.                  | 0.00003  | 118           | 0.00354           | Y S                 | 3.54E-11  | 46.9 0.               | 0.001407              | 4.1 AN          | 7.20E 12  | 1.5 -4.5E-05                     |                       | NA -4.50E-13        | 8.44             | 0.000253        | AN S     | 2.53E-12  | -5.8             | -0.00017        | Y S                  | -1.74E-12 |
|                             | 2.00003  |               | -0.1 E-00         | 1 3E-08             | -0.10E-13 |                       | 4                     | 12.7 - NA -7.27 | CI-I0     |                                  | -16                   | <i>-</i> 1          |                  | -4.ZE-U3        |          | -4.20E-13 | -1.7             | -5.1E-05        | -1 7E-08             | Ö. 10E-13 |
| PCB-126                     | 0.1      | -1.7          | -0.17             |                     | -1.70E-09 | -3.1                  | -0.31                 | ٠.              | -3.10E-09 | -1.9 -0.19                       | 101-                  | NA -1.90E-09        |                  | -0.15           | NA       | -1.50E-09 | -2               | -0.2            |                      | -2.00E-09 |
| PCB-155                     |          | -0.45         |                   |                     |           | -1.1                  |                       |                 | H         |                                  |                       |                     | -0.73            |                 | -7.3E-09 |           | -0.75            |                 |                      |           |
| PCB-152                     |          | -0.41         |                   | -4.1E-09            |           | -0.87                 | Ψ                     | -8.7E-09        |           | 9.0-                             | -6.0E-09              | 61                  | -0.46            |                 | -4.6E-09 |           | -0.58            |                 | -5.8E-09             |           |
| PCB-150                     |          | -0.4          |                   | -4.0E-09            |           | -0.84                 | ۱ ب                   | 1.4E-09         | 1         | -0.57                            | -5.7E-(               | 60                  | -0.45            |                 | -4.5E-09 |           | -0.55            |                 | -5.5E-09             |           |
| PCB-136                     |          | 8.67          |                   | 8.7E-08             |           | 1.54                  | - 0                   | 7.5E-08         | 1         | -0.64<br>-0.62                   | -6.4E-09              | 5 0                 | r-<br>-0 49      |                 | -1.0E-08 |           | 9.0              |                 | -6.0E-09             |           |
| PCB-148                     |          | -0.61         |                   | -6.1E-09            |           | -1.3                  | -                     | .3E-08          |           | -0.88                            | -8.8E-0               | 6                   | -0.68            |                 | -6.8E-09 |           | -0.85            |                 | -8.5E-09             |           |
| PCB-135/151                 |          | 25.9          |                   | 2.6E-07             |           | 16.6                  |                       | 1.7E-07         |           | -0.93                            | -9.3E-09              | 61                  | -1.4             |                 | -1.4E-08 |           | 6.0-             |                 | -9.0E-09             |           |
| PCB-154                     |          | -0.5          |                   | -5.0E-09            |           | -1.1                  | - 0                   | -1.1E-08        |           | -0.73                            | -7.3E-09              | 6                   | -0.57            |                 | -5.7E-09 |           | -0.7             |                 | -7.0E-09             |           |
| PCB-144                     |          | 74.55         |                   | 7.5E-08             |           | 2.72                  |                       | 5E-07           | 1         | -0.95                            | -9.5E-(               | 6 ×                 | -5.9             |                 | -7.4E-09 |           | -0.92            |                 | -9.2E-09<br>-4.7E-08 |           |
| PCB-134/143                 |          | -5.7          |                   | -5.7E-08            |           | -2                    | 127                   | .0E-08          |           | -1.7                             | -1.7E-0               | 8 8                 | - 1-             |                 | -1.0E-08 |           | -1.5             |                 | -1.5E-08             |           |
| PCB-139/140                 |          | -2.4          |                   | -2.4E-08            |           | -1.6                  | -                     | .6E-08          |           | -1.4                             | -1.4E-C               | 81                  | -0.84            |                 | -8.4E-09 |           | -1.3             |                 | -1.3E-08             |           |
| PCB-131                     |          | -1.6          |                   | -1.6E-08            |           | 7 0                   | ,710                  | .0E-08          |           | -1.7                             | -1.7E-C               | 800                 | 1.1              |                 | -1.1E-08 |           | -1.6             |                 | -1.6E-08             |           |
| PCB-142                     |          | 2.r-<br>7.8.6 |                   | -1.3E-08            |           | 25.3                  | 7 0                   | :.0E-08         | 1         | 1.7-                             | -1./E-(               | 80 8                | -                |                 | -1.0E-08 |           | C. L.            |                 | -1.5E-08             |           |
| PCB-132                     |          | 1.4           |                   | -1.4E-08            |           | -1.9                  | 7 -                   | 3E-08           | -         | -1.6                             | -1.0E-0               | 9. 8.               | 76:0-            |                 | -1.0L-09 |           | -1.5             |                 | -2.5L-08<br>-1.5E-08 |           |
| PCB-165                     |          | -0.98         |                   | -9.8E-09            |           | -1.4                  | -                     | .4E-08          | H         | -1.2                             | -1.2E-C               | 18                  | -0.74            |                 | -7.4E-09 |           | -1.1             |                 | -1.1E-08             |           |
| PCB-146                     |          | 14.2          |                   | 1.4E-07             |           | 7.7-                  |                       | .7E-08          |           | -1.4                             | -1.4E-0               | 80                  | -1.1             |                 | -1.1E-08 |           | -1.3             |                 | -1.3E-08             |           |
| PCB-181                     |          | -0.34         |                   | -9.4E-09            |           | -1.4                  | - 12                  | .4E-00          |           | -2.5                             | -1.2E-1               | 0 0                 | -0.72            |                 | -7.2E-09 |           | -1.1             |                 | -1.1E-00             |           |
| PCB-141                     |          | 26.8          |                   | 2.7E-07             |           | 12.4                  |                       | .2E-07          |           | -1.6                             | -1.6E-0               | 8                   | 1.3              |                 | 1.3E-08  |           | -1.5             |                 | -1.5E-08             |           |
| PCB-130                     |          | -7.3          |                   | -7.3E-08            |           | -4.3                  | 4                     | :3E-08          |           | -1.9                             | -1.9E-C               | 81                  | -1.2             |                 | -1.2E-08 |           | -1.8             |                 | -1.8E-08             |           |
| PCB-137/164                 |          | -14           |                   | -1.4E-07            |           | 10.3                  | 112                   | 1.0E-07         | 1         | -1.4                             | -1.4E-C               | 800                 | -0.85            |                 | -8.5E-09 |           | 6                |                 | -1.3E-08             |           |
| PCB-123/133/133             |          | - 1           |                   | -1.0E-08            |           | -1.5                  | -   -                 | .5E-08          | -         | -1.3                             | -3.3E-0               | 8.                  | -0.78            |                 | -7.8E-09 |           | -1.2             |                 | -0.3E-08             |           |
| PCB-158                     |          | 15.2          |                   | 1.5E-07             |           | 6.6                   | 0)                    | :9E-08          |           | 1-                               | -1.0E-C               | 81                  | -0.9             |                 | -9.0E-09 |           | -0.96            |                 | -9.6E-09             |           |
| PCB-128/166                 |          | -20           |                   | -2.0E-07            | 1         | 11.9                  | - 1                   | .2E-07          |           | 4.1-                             | -1.4E-(               | 80                  | -0.88            |                 | -8.8E-09 |           | 5. 1.3           |                 | -1.3E-08             |           |
| PCB-139                     |          | -1.99         |                   | -9.9E-09            |           | -1.5                  | 17                    | .5E-08          | 1         | -1.3                             | -1.2E-08              | 9.80                | -0.78            |                 | -7.3E-09 |           | -1.2             |                 | -1.1E-08             |           |
|                             | 0.00003  | 5             | -0.00045          | NA                  | -4.50E-12 | -3.5                  | -0.00011              | NA -1.0         | -1.05E-12 | -1.4 -4.2E-05                    |                       | NA -4.20E-13        | -2.1             | -6.3E-05        | NA       | -6.30E-13 | -1.3             | -3.9E-05        | NA                   | -3.90E-13 |
| 0                           | 0.00003  | -5.3          | -0.00016          | Y :                 | -1.59E-12 | m ;                   | 600000                |                 | 0E-13     | -1 -0.00003                      |                       | A -3.00E-13         | -0.62            | -1.9E-05        | ĕ :      | -1.86E-13 | 96.0-            | -2.9E-05        | N S                  | -2.88E-13 |
|                             | 0.03     | 1.1-          | -0.033            | A OF OO             | -3.30E-10 | 1.1                   |                       | NA -4.2         | -4.20E-10 |                                  | ±6 9                  | _                   | -0.65            | -0.0195         | NA PE O  | -1.95E-10 | r-<br>08 0       | -0.03           | NA OF O              | 3.00E-10  |
| PCB-179                     |          | 6.3           |                   | 6.3E-08             |           | 5.49                  | 2                     | .5E-08          |           | -0.66                            | -6.6E-09              | 6.                  | -0.38            |                 | -4.8E-09 |           | -0.83            |                 | -8.3E-09             |           |
| PCB-184                     |          | -0.55         |                   | -5.5E-09            |           | -0.86                 | ې                     | :eE-09          |           | -0.59                            | -5.9E-C               | 60                  | -0.43            |                 | -4.3E-09 |           | -0.75            |                 | -7.5E-09             |           |
| PCB-176                     |          | 4. 1.         |                   | -1.4E-08            |           | 2.12                  |                       | .1E-08          |           | 79.0-                            | -6.7E-C               | 60                  | -0.49            |                 | -4.9E-09 |           | -0.85            |                 | -8.5E-09             |           |
| PCB-186                     |          | 9.0           |                   | -6.0E-09            |           | L- Z-V                | 7                     | .0E-08          | 1         | -0.68                            | -6.8E-C               | 60                  | -0.5             |                 | -5.0E-09 |           | -0.87            |                 | -8.7E-09             |           |
| PCB-175                     |          | -4.1          |                   | -4.1E-00            |           | - 4<br>- 1.           | 4 7                   | .7E-08          |           |                                  | -1.0E-0               | 0 80                | -0.73            |                 | -7.3E-09 |           |                  |                 | -1.3E-08             |           |
| PCB-187                     |          | 20.3          |                   | 2.0E-07             |           | 18.8                  | _                     | .9E-07          |           | -0.85                            | -8.5E-C               | 6                   | -1.6             |                 | -1.6E-08 |           | -2               |                 | -2.0E-08             |           |
| PCB-182                     |          | -0.81         |                   | -8.1E-09            |           | 1.4                   | 17                    | -1.4E-08        |           | -0.93                            | -9.3E-09              | 60                  | 89.0-            |                 | -6.8E-09 |           | -1.2             |                 | -1.2E-08             |           |
| PCB-183                     |          | 12            | 1                 | 1.2E-07             | 1         | 12.8                  |                       | .3E-07          | +         | -0.94<br>n oe                    | -9.4E-(               | 600                 | 99.0-            | 1               | -6.9E-09 |           | -1.2             |                 | -1.2E-08             |           |
|                             |          | 1.1-          |                   | -1./E-00            |           | #:<br> -              |                       | -4E-U0          | 1         | -0.30                            | -3.0E-                | <u> </u>            |                  |                 | -7.UE-U  |           | 7:1-             |                 | -1.2E-00             |           |

|                                  |         |       | BA-1     |          |          |            | BA-2     | -2       |                       |       | BA-3-BLANK | ŇĶ                                          |          | 35         | 356-4                 |                       |          | 356-5    | -5       |           |
|----------------------------------|---------|-------|----------|----------|----------|------------|----------|----------|-----------------------|-------|------------|---------------------------------------------|----------|------------|-----------------------|-----------------------|----------|----------|----------|-----------|
|                                  |         |       |          | Non-TEQ  |          |            | <u>-</u> | Non-TEQ  |                       |       | Ň          | Non-TEQ                                     |          |            | Non-TEQ               |                       |          |          | Non-TEQ  |           |
| :                                | ļ       | 3s    | ğ        |          | _        | All PCBs I | ğ        |          | ~                     | 3s PC |            |                                             | ₹        | 2          |                       | PCB TEQ               | All PCBs | PCB TEQ  |          | PCB TEQ   |
| Sample Name                      | ±       | (bd)  | (bd)     | ٠.       | (hg/cm_) | (bd)       | (bd)     | _        | (hg/cm <sup>-</sup> ) |       | п) (bd)    | (hg/cm <sup>-</sup> ) (hg/cm <sup>-</sup> ) | ٤        | (bd)       | (hg/cm <sup>-</sup> ) | (hg/cm <sup>-</sup> ) | (bd)     | (bd)     | _        | (hg/cm_)  |
| PCB-1/4                          |         | 20.8  |          | 2.1E-U/  |          | 7.61       |          | 1.9E-07  |                       | 7     | 1          | -1.0E-U8                                    | -0.84    |            | -8.4E-09              |                       | S.I      |          | -1.3E-U8 |           |
| PCB-1//                          |         | 10.2  |          | 1.0E-07  |          | -6.3       |          | -6.3E-08 |                       | -1.1  |            | -1.1E-08                                    | -0.81    |            | -8.1E-09              |                       | -1.4     |          | -1.4E-08 |           |
| PCB-181                          |         | -0.88 |          | -8.8E-09 |          | -1.5       |          | -1.5E-08 |                       | ۲-    | 1          | -1.0E-08                                    | -0.74    | +          | -7.4E-09              |                       | -1.3     |          | -1.3E-08 |           |
| PCB-171/173                      |         | 6.74  |          | 6.7E-08  |          | 6.42       |          | 6.4E-08  |                       | -1.1  | -          | -1.1E-08                                    | -0.81    | 1          | -8.1E-09              |                       | -1.4     |          | -1.4E-08 |           |
| PCB-172                          |         | 3.89  |          | 3.9E-08  |          | -3.1       |          | -3.1E-08 |                       | -1.1  |            | -1.1E-08                                    | -0.81    | 1          | -8.1E-09              |                       | 4.1-     |          | -1.4E-08 |           |
| PCB-192                          |         | -0.74 |          | -7.4E-09 |          | -1.2       |          | -1.2E-08 |                       | -0.85 | 1          | -8.5E-09                                    | -0.62    | 2          | -6.2E-09              |                       | -1.1     |          | -1.1E-08 |           |
| PCB-180/193                      |         | 44.6  |          | 4.5E-07  |          | 51         |          | 5.1E-07  |                       | -1.1  | '          | -1.1E-08                                    | 4.89     | e          | 4.9E-08               |                       | -2       |          | -2.0E-08 |           |
| PCB-191                          |         | 4.1-  |          | -1.4E-08 |          | -1         |          | -1.0E-08 |                       | -0.72 | ſ          | -7.2E-09                                    | -0.53    | 3          | -5.3E-09              |                       | -0.91    |          | -9.1E-09 |           |
| PCB-170                          |         | 17.4  |          | 1.7E-07  |          | -14        |          | -1.4E-07 |                       | -0.83 | 7          | -8.3E-09                                    | -0.78    | 3          | -7.8E-09              |                       | 1.56     |          | 1.6E-08  |           |
| PCB-190                          |         | -3.4  |          | -3.4E-08 |          | -2.8       |          | -2.8E-08 |                       | -0.52 | Ĭ          | -5.2E-09                                    | -0.38    | 3          | -3.8E-09              |                       | -0.66    |          | -6.6E-09 |           |
| PCB-189                          | 0.00003 | 1.46  | 4.38E-05 | ν        | 4.38E-13 | -0.88      | -2.6E-05 | NA -2.6  | -2.64E-13             | 49:0- | -1.9E-05   | NA -1.92E-13                                | 13 -0.47 | 7 -1.4E-05 | AN                    | -1.41E-13             | -0.57    | -1.7E-05 | AN       | -1.71E-13 |
| PCB-202                          |         | -2.4  |          | -2.4E-08 |          | 2.17       |          | 2.2E-08  |                       | 76:0- | 7          | -9.7E-09                                    | -0.87    |            | -8.7E-09              |                       | -0.82    |          | -8.2E-09 |           |
| PCB-201                          |         | 2.03  |          | 2.0E-08  |          | -0.98      |          | -9.8E-09 |                       | 1-    | -          | -1.0E-08                                    | -0.74    | 1          | -7.4E-09              |                       | -0.8     |          | -8.0E-09 |           |
| PCB-204                          |         | -0.49 |          | -4.9E-09 |          | -0.97      |          | -9.7E-09 |                       | ٢     | 1          | -1.0E-08                                    | -0.74    | t          | -7.4E-09              |                       | -0.79    |          | -7.9E-09 |           |
| PCB-197                          |         | -0.54 |          | -5.4E-09 |          | -0.95      |          | -9.5E-09 |                       | 86:0- | 7          | -9.8E-09                                    | -0.72    | 2          | -7.2E-09              |                       | -0.77    |          | -7.7E-09 |           |
| PCB-200                          |         | -0.5  |          | -5.0E-09 |          | -0.99      |          | -9.9E-09 |                       | -1    | -          | -1.0E-08                                    | -0.75    | 5          | -7.5E-09              |                       | -0.81    |          | -8.1E-09 |           |
| PCB-198/199                      |         | 6.94  |          | 6.9E-08  |          | 7.94       |          | 7.9E-08  |                       | 86:0- | 7          | -9.8E-09                                    | -0.72    | 2          | -7.2E-09              |                       | -0.77    |          | -7.7E-09 |           |
| PCB-196                          |         | -3.5  |          | -3.5E-08 |          | 3.34       |          | 3.3E-08  |                       | 96:0- | 7          | -9.6E-09                                    | -0.71    | 1          | -7.1E-09              |                       | -0.76    |          | -7.6E-09 |           |
| PCB-203                          |         | 5.42  |          | 5.4E-08  |          | -3.2       |          | -3.2E-08 |                       | -0.95 | 7          | -9.5E-09                                    | 7.0-     | 7          | -7.0E-09              |                       | -0.75    |          | -7.5E-09 |           |
| PCB-195                          |         | 6-    |          | -3.0E-08 |          | -2.6       |          | -2.6E-08 |                       | -0.95 | 7          | -9.5E-09                                    | -0.87    |            | -8.7E-09              |                       | -0.89    |          | -8.9E-09 |           |
| PCB-194                          |         | 10.4  |          | 1.0E-07  |          | -6.5       |          | -6.5E-08 |                       | 1.7   |            | 1.7E-08                                     | -1.9     | 9          | -1.9E-08              |                       | -1       |          | -1.0E-08 |           |
| PCB-205                          |         | -0.92 |          | -9.2E-09 |          | -0.86      |          | -8.6E-09 |                       | -0.92 | 7          | -9.2E-09                                    | -0.71    | 1          | -7.1E-09              |                       | -0.81    |          | -8.1E-09 |           |
| PCB-208                          |         | -2.5  |          | -2.5E-08 |          | -5.1       |          | -5.1E-08 |                       | -2    | -          | -2.0E-08                                    | 3.43     | 3          | 3.4E-08               |                       | -2.1     |          | -2.1E-08 |           |
| PCB-207                          |         | -1.8  |          | -1.8E-08 |          | -2.6       |          | -2.6E-08 |                       | -2    | 7          | -2.0E-08                                    | -1.7     | 7          | -1.7E-08              |                       | -1.9     |          | -1.9E-08 |           |
| PCB-206                          |         | 9.73  |          | 9.7E-08  |          | 11.5       |          | 1.2E-07  |                       | -2.8  |            | -2.8E-08                                    | -4.34    | <u>+</u>   | -4.3E-08              |                       | -7.41    |          | -7.4E-08 |           |
|                                  |         |       |          |          |          |            |          |          |                       |       |            |                                             |          |            |                       |                       |          |          |          |           |
| PCB-209                          |         | -38.8 |          | -3.9E-07 |          | -222       |          | -2.2E-06 |                       | 134   |            | 1.3E-06                                     | -116     | 3          | -1.2E-06              |                       | -130     |          | -1.3E-06 |           |
| Non-TEQ PCBs (ND = 0)            |         |       |          | 1.9E-05  |          |            |          | 1.4E-05  |                       |       |            | 2.2E-06                                     |          |            | 9.3E-07               |                       |          |          | 5.9E-07  |           |
| Non-TEQ PCBs (ND = 1/2 DL)*      |         |       |          | 2.1E-05  |          |            |          | 1.7E-05  |                       |       |            | 3.2E-06                                     |          |            | 2.9E-06               |                       |          |          | 2.9E-06  |           |
| Non-TEQ PCBs (ND = DL)           |         |       |          | 2.2E-05  |          |            |          | 1.9E-05  |                       |       |            | 4.3E-06                                     |          |            | 4.9E-06               |                       |          |          | 5.1E-06  |           |
| Lower Bound PCB TEQ (ND = 0)     |         |       |          |          | 6.4E-11  |            |          | 7        | 2.2E-11               |       |            | 0.0E+00                                     | 00       |            |                       | 5.4E-12               |          |          |          | 0.0E+00   |
| Mid Point PCB TEQ (ND = 1/2 DL)* |         |       |          |          | 1.1E-09  |            |          | -        | 1.8E-09               |       |            | 1.1E-09                                     | 99       |            |                       | 8.6E-10               |          |          |          | 1.2E-09   |
| Upper Bound PCB TEQ (ND = DL)    |         |       |          |          | 2.1E-09  |            |          |          | 3.6E-09               | -     |            | 2.3E-09                                     | 60       |            |                       | 1.7E-09               |          |          |          | 2.3E-09   |

Notes/Abbreviations
"." = "<" (reported less than the detection
limit).

Highlighted cells indicate a blank adjustment
was made (see Appendix C).
\* = used in report tables
NA = not applicable; PCB TEQ calculated.

|                                         |      |            | ENG-558-DFP-03 | JFP-02             |             | EN           | ENG-583-DFP-0                            | 2                               | ENG-             | ENG-168-DFP-01     |                 |                  | DFP-BLAN  | ٧K                   |              | ENG-1         | ENG-159-DFP-1               |           |
|-----------------------------------------|------|------------|----------------|--------------------|-------------|--------------|------------------------------------------|---------------------------------|------------------|--------------------|-----------------|------------------|-----------|----------------------|--------------|---------------|-----------------------------|-----------|
| Sample Name                             |      | All PCBs P | PCB TEQ        | Non-TEQ<br>PCBs PC | PCB TEQ All | All PCBs PCB | Non-TEQ<br>PCB TEQ PCBs<br>(pg) (ug/cm²) | EQ<br>s PCB TEQ<br>n²) (ua/cm²) | All PCBs PCB TEQ | Non-TEQ<br>EQ PCBs | PCB TEQ         | All PCBs PCE     | PCB TEQ F | Non-TEQ PCBs PCB TEQ | TEQ All PCBs | Bs PCB TEQ    | Non-TEQ<br>PCBs<br>(ua/cm²) | PCB TEQ   |
|                                         |      | -1.4       | T              |                    |             | -7           | t                                        |                                 | 1.4<br>-1.4      | ╁                  |                 | 1.6              | t         | _                    | (F)          | 3.1           | -3.1E-08                    | (         |
| PCB-002                                 |      | -4.04      |                | -4.0E-08           |             | -5.95        | -6.0E                                    | -08                             | -2.8             | -2.8E-08           | 8               | -2.4             |           | 2.4E-08              |              | -3.6          | -3.6E-08                    |           |
| PCB-003                                 |      | -5.05      |                | -5.1E-08           |             | -5.25        | -5.3E                                    | -08                             | -4. <del>4</del> | -4.4E-0            | 8 0             | -3.3             | 1         | 3.3E-08              |              | 3.7           | -3.7E-08                    |           |
| PCB-004                                 |      | 4 000      |                | -4.0E-08           |             | -3.9         | -3.9E                                    | 80-80                           | -3.7             | -3.7E-C            | ∞ α             | -2.7             |           | 2.7E-08              |              | -12           | -1.2E-07                    |           |
| PCB-000                                 |      | -1         |                | -1.0E-08           |             | -1.3         | -1.3E-08                                 | 90-                             | 1.1-             | -1.1E-08           | 0 80            | 1.8              |           | -1.8E-08             |              | 8.3           | -8.3E-08                    |           |
| PCB-007                                 |      | 4.69       |                | 4.7E-08            |             | -1.2         | -1.2E                                    | -08                             | 4.09             | 4.1E-0             | 8               | -1.7             |           | -1.7E-08             |              | -8.1          | -8.1E-08                    |           |
| PCB-006                                 |      | -3.5       |                | -3.5E-08           |             | 4.3          | -4.3E                                    | -08                             | -2.9             | -2.9E-0            | 8               | 2.29             |           | 2.3E-08              |              | 8.5           | -8.5E-08                    |           |
| PCB-005                                 |      | -1.1       | 1              | -1.1E-08           |             | -1.5         | -1.5E                                    | -08                             | -1.3             | -1.3E-0            | 8               | -2               | 1         | 2.0E-08              |              | 9.6           | -9.6E-08                    |           |
| FCB-009                                 |      | 7.1-       |                | -1.7E-08           |             | -1.2         | -1.2E                                    | -08                             | 1.5.1            | -1.7E-0            | ~ 80            | 0. 4.            |           | -4.0E-00             |              | -10           | -9.6E-00                    |           |
| PCB-011                                 |      | 762        |                | 7.6E-06            |             | 1050         | 1.1E-05                                  | -05                             | 136              | 1.4E-0             | 9               | 38.7             | -         | 3.9E-07              |              | 948           | 9.5E-06                     |           |
| PCB-012/013                             |      | -10        |                | -1.0E-07           |             | -19          | -1.9E                                    | -07                             | 5.62             | 5.6E-0             | 8               | -1.9             |           | 1.9E-08              |              | -10           | -1.0E-07                    |           |
| PCB-015                                 |      | 20.8       |                | 2.1E-07            |             | 17           | 1.7E-07                                  | -07                             | -13              | -1.3E-07           | 7               | -2.2             |           | -2.2E-08             |              | -14           | -1.4E-07                    |           |
| PCB-019                                 |      | -2.3       |                | -2.3E-08           |             | 1.83         | 1.8E                                     | -08                             | -0.87            | -8.7E-0            | 1 0             | -0.85            | 1         | 3.5E-09              |              | -4.9          | -4.9E-08                    |           |
| PCB-018/030                             |      | 13.1       |                | 2./E-0/<br>1.3E-07 |             | 1.1          | 1.1E-07<br>6.3E-08                       | -0.                             | 12.1             | 7.2E-U             | _ α             | -2.5             |           | -2.5E-08<br>-1.1E-08 |              | 5.7           | -8.4E-08                    |           |
| PCB-027                                 |      | - 1-       |                | -1.1E-08           |             | -0.7         | -7.0E-09                                 | 60-                             | -0.74            | -7.4E-0            | 0 0             | -0.84            |           | -8.4E-09             |              | -4.2          | -4.2E-08                    |           |
| PCB-024                                 |      | -0.52      |                | -5.2E-09           |             | -0.61        | -6.1E-09                                 | 60-                             | -0.72            | -7.2E-09           | 6               | -0.84            | 7         | -8.4E-09             |              | 4.2           | -4.2E-08                    |           |
| PCB-016                                 |      | -13        |                | -1.3E-07           |             | 90.9         | 6.1E-08                                  | -08                             | 6.81             | 6.8E-0             | 8               | -2               |           | -2.0E-08             |              | 6.9           | -6.9E-08                    |           |
| PCB-032                                 |      | 10.8       |                | 1.1E-07            |             | 3.83         | 3.8E                                     | -08                             | 4.45             | 4.5E-08            | 8 0             | -1.5             | +         | -1.5E-08             |              | 4 (           | -4.0E-08                    |           |
| PCB-034                                 |      | 1-         | 1              | -1.0E-08           |             | -0.76        | -7.6E                                    | 60-                             | -1.1             | -1.1E-08           | 20 0            | -1.2             | ' '       | -1.2E-08             |              | 5.2           | -5.2E-08                    |           |
| PCB-023                                 |      | -0.97      |                | -9.7E-09           |             | 4 16         | -7.2E-09<br>4.2E-08                      | 80.                             | - 8-             | -1.0E-08           | ∞ α             |                  | +         | -1.1E-08             |              | 9.4           | -4.9E-08                    |           |
| PCB-025                                 |      | 4.4        |                | -4.4E-08           |             | -2.1         | -2.1E-08                                 | -08                             | -2.1             | -2.1E-08           | 8               | 7                |           | -1.0E-08             |              | 4.4           | -4.4E-08                    |           |
| PCB-031                                 |      | 53.6       |                | 5.4E-07            |             | 19           | 1.9E-07                                  | -07                             | 21.5             | 2.2E-07            | 7               | 5.02             |           | 5.0E-08              | _            | 17.3          | 1.7E-07                     |           |
| PCB-020/028                             |      | 74.6       |                | 7.5E-07            |             | 22.6         | 2.3E-07                                  | -07                             | 26.5             | 2.7E-0             | 7               | -5.3             | 1         | -5.3E-08             |              | 4.8           | -4.8E-08                    |           |
| PCB-021/033                             |      | 43.5       |                | 4.4E-07            |             | -14          | -1.4E-07                                 | -07                             | 18.1             | 1.8E-07            | 7               | -2.7             | 1         | 2.7E-08              |              | -4.7          | -4.7E-08                    |           |
| PCB-022                                 |      | 78.1       |                | Z.8E-07            |             | 19.81        | 9.9E-08                                  | 80-                             | 10.8             | 1.1E-0,            | _ α             | 2.28             | 1         | 2.3E-08              |              | -5.1          | -5.1E-08                    |           |
| PCB-039                                 |      | 66.0-      |                | -9.9E-09           |             | -0.73        | -2.3L                                    | 60-                             | - 1              | -1.0E-08           | 0 00            | - <del>-</del> - |           | -1.1E-08             |              | 4.9           | -4.9E-08                    |           |
| PCB-038                                 |      | -1.1       |                | -1.1E-08           |             | -0.79        | -7.9E-09                                 | 60-                             | -1.1             | -1.1E-08           | 8               | -1.2             |           | 1.2E-08              |              | -5.3          | -5.3E-08                    |           |
| PCB-035                                 |      | -12        |                | -1.2E-07           |             | 23.3         | 2.3E                                     | -07                             | -3.8             | -3.8E-08           | 8               | -1.3             |           | -1.3E-08             |              | -7.4          | -7.4E-08                    |           |
| PCB-037                                 |      | 36.2       |                | 3.6E-07            |             | 16.4         | 1.6E                                     | -07                             | 17               | 1.7E-0             | 7               | -1.8             | +         | -1.8E-08             |              | 17.3          | 1.7E-07                     |           |
| PCB-054                                 |      | -0.3       |                | -3.0E-09           |             | -0.42        | -4.2E                                    | 60-                             | -0.48            | -4.8E-09           | 600             | -0.58            | Y   `     | -5.8E-09             |              | 2-2           | -2.0E-08                    |           |
| PCB-030/033                             |      | 12.1       |                | 1.2F-07            |             | 12           | 1.1F                                     | -02                             | 10.3             | 1 0F-07            | 0 /             |                  |           | -1.1E-08             |              | 5.3           | -2.3E-00                    |           |
| PCB-046                                 |      | 2.97       |                | 3.0E-08            |             | 1.38         | 1.4E                                     | -08                             | -0.85            | -8.5E-0            | . 6             | -1.3             |           | -1.3E-08             |              | -3.5          | -3.5E-08                    |           |
| PCB-052                                 |      | 65.2       |                | 6.5E-07            |             | 55.2         | 5.5E                                     | -07                             | 110              | 1.1E-06            | 9               | -1.1             |           | -1.1E-08             | 2            | 26.2          | 2.6E-07                     |           |
| PCB-073                                 |      | -0.45      |                | -4.5E-09           |             | -0.66        | -6.6E                                    | 60-                             | -0.56            | -5.6E-09           | 6               | -0.85            | 7         | -8.5E-09             |              | -2.3          | -2.3E-08                    |           |
| PCB-043                                 |      | -1.2       | 1              | -1.2E-08           |             | -1.3         | -1.3E                                    | -08                             | -0.97            | -9.7E-0            | 6               | 5.1.5            | 1         | -1.5E-08             |              | 4- 0          | -4.0E-08                    |           |
| PCB-049/089                             |      | 11.2       |                | 1 1E-07            |             | 404          | -1.3r                                    | /Q-                             | -5.4             | 2.7E-0.7           | - α             | <br>             |           | 1.2E-08              |              | -3.1          | -0.0E-U0                    |           |
| PCB-044/047/065                         |      | 66.8       |                | 6.7E-07            |             | 81.6         | 8.2E-07                                  | -07                             | 95.7             | 9.6E-07            | 7               | 4.6              | 1         | -4.6E-08             |              | 20.3          | 2.0E-07                     |           |
| PCB-059/062/075                         |      | 4.84       |                | 4.8E-08            |             | -1.6         | -1.6E                                    | -08                             | -2               | -2.0E-08           | 8               | -0.88            | Ť         | 3.8E-09              |              | -2.4          | -2.4E-08                    |           |
| PCB-042                                 |      | 16.2       |                | 1.6E-07            |             | -5.4         | -5.4E                                    | -08                             | 9:36             | 9.4E-0             | 8 1             | 6.1.             |           | 1.3E-08              |              | 3.6           | -3.6E-08                    |           |
| PCB-040/041/071                         |      | 34.1       |                | 3.4E-07            |             | 14.2         | 1.4E-07                                  | -07                             | 19.6             | 2.0E-U             | ,               | 1.26             | 1         | 1.2E-08              | 35 G.        | 9.92          | 9.9E-08                     |           |
| PCB-034                                 |      | -0.86      |                | -8.6E-09           |             | -0.91        | -9.1E                                    | 60-                             | 66:0-            | -9.9E-0            | 6               | 66.0-            | "         | 3E-09                |              | -2.9          | -2.9E-08                    |           |
| PCB-068                                 |      | 4.51       |                | 4.5E-08            |             | 7.74         | 7.7E-08                                  | -08                             | -5.1             | -5.1E-0            | 8               | -0.93            | 1         | -9.3E-09             |              | -2.7          | -2.7E-08                    |           |
| PCB-057                                 |      | -0.92      |                | -9.2E-09           |             | -0.97        | -9.7E-09                                 | 60-                             | -1.1             | -1.1E-08           | 8               | -1.1             | '         | 1.1E-08              |              | -3.1          | -3.1E-08                    |           |
| PCB-058                                 |      | 1.67       |                | 1./E-08            |             | -0.89        | -8.9r                                    | 60                              | 76.0-<br>08.0-   | -9.7E-09           | 5 0             | 76:0-<br>08:0-   | 17        | -9.7E-09             |              | -2.8          | -2.8E-08                    |           |
| PCB-063                                 |      | -1.8       |                | -1.8E-08           |             | -0.9         | -9.0E                                    | 60-                             | 86:0-            | -9.8E-0            | 6               | 96:0-            | 7         | -9.8E-09             |              | -2.9          | -2.9E-08                    |           |
| PCB-061/070/074/076                     |      | 105        |                | 1.1E-06            |             | 90.5         | 9.1E-07                                  | -07                             | 150              | 1.5E-06            | 9               | -3               |           | -3.0E-08             | 4)           | 54.5          | 5.5E-07                     |           |
| PCB-066                                 |      | 58.3       | 1              | 5.8E-07            |             | 31.4         | 3.1E-07                                  | -07                             | 49.2             | 4.9E-07            | 7               | 6, <u>1</u>      | 1         | -1.3E-08             | 7            | 23.1          | 2.3E-07                     |           |
| PCB-039                                 |      | 39         |                | 3.9F-07            |             | -0.99        | -9.9E                                    | 50-                             | -1.1             | -1.1E-U            | 8               | 1.1.             |           | 1.1E-08              |              | -3.2          | -3.2E-08<br>-1.5E-07        |           |
| PCB-060                                 |      | -20        |                | -2.0E-07           |             | 11.1         | 1.1E-07                                  | -07                             | 13               | 1.3E-07            | 7               | 1.1              |           | -1.1E-08             | 0,           | 9.44          | 9.4E-08                     |           |
| DCB-080                                 |      | -0.81      |                | -8.1E-09           |             | -0.85        | -8.5E-09                                 | 60-                             | -0.93            | -9.3E-0            | 6               | -0.93            | 7         | 9.3E-09              |              | -2.7          | -2.7E-08                    |           |
| PCB-079                                 |      | -1.2       | 1              | -1.2E-08           |             | -1.7         | -1.7E                                    | 80-08                           | -2.6             | -2.6E-0            | 80 0            | -0.99            | Y   '     | -9.9E-09             |              | -2.9          | -2.9E-08                    |           |
| 870-934<br>870-934                      | 0000 | -1-        | 0.00143        |                    | 1 A3E 11    | 16.1         | -1.1E                                    | -08<br>NA 161E 11               | -1.2             | -1.ZE              | 8<br>A 0 50E 12 | 1.2              | 00004     | -                    | 40E 12       | -3.4          | -3.4E-U8                    | 8 70E 12  |
| PCB-071                                 |      |            | -0.00033       |                    | -3.30E-12   |              |                                          | NA -3,30E-12                    | 4:0              | 139 NA             |                 |                  | -0.00014  | NA -3.90E-           | 12           | -3.3 -0.00099 | Z Z                         | -9.70E-12 |
| PCB-104                                 |      |            | _              |                    |             | -0.73        | +                                        |                                 | -0.69            | -6.9E              |                 |                  | -         |                      |              |               | -2.5E                       |           |
| PCB-096                                 |      | -0.49      |                | -4.9E-09           |             | -0.71        | -7.1E-09                                 | 60-                             | -1.2             | -1.2E-08           | 8 6             | -0.71            | +         | -7.1E-09             |              | -2.1          | -2.1E-08                    |           |
| PCB-103                                 |      | -0.87      |                | -8.7E-09           |             | -1.6         | -1.6F                                    | 80, 80                          | t. 1.            | -1.5E-C            | 20 α            | -1.1             |           | -1.1E-08             |              | -3.4          | -3.4E-08                    |           |
| = ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |      | -          |                | 20.1               |             | 2            | -                                        | 200-                            | la:1-            | 2                  | 0               | 2                |           | .3L-00-              |              | 0.0           | 30.00                       |           |

|                             |         |              | ENG-558-DFP-0; | )FP-02                      |           |                | ENG-583-DFP-02 | FP-02                                |               | ENG              | ENG-168-DFP-0    | 1                               |              | DFP-BLAN | LANK                        |                     |             | ENG-159-DFP-1 | DFP-1               |                     |
|-----------------------------|---------|--------------|----------------|-----------------------------|-----------|----------------|----------------|--------------------------------------|---------------|------------------|------------------|---------------------------------|--------------|----------|-----------------------------|---------------------|-------------|---------------|---------------------|---------------------|
| Sample Name                 | A TEF   | All PCBs Pi  | PCB TEQ        | Non-TEQ<br>PCBs<br>(ua/cm²) | PCB TEQ / | All PCBs P     | PCB TEQ F      | Non-TEQ<br>PCBs PCB<br>(ua/cm²) (ua/ | TEQ           | All PCBs PCB TEQ | Non-TEQ TEQ PCBs | EQ<br>s PCB TEQ<br>n²) (ua/cm²) | A All PCBs   | PCB TEQ  | Non-TEQ<br>PCBs<br>(uq/cm²) | PCB TEQ<br>(ua/cm²) | All PCBs    | PCB TEQ       | Non-TEQ<br>PCBs F   | PCB TEQ<br>(ua/cm²) |
| PCB-095                     |         | 49.5         | ╁              | 5.0E-07                     |           | 85.7           | t              |                                      |               | 172              | t                | -                               |              | (FB)     | -1.3E-08                    |                     | 26.3        | t             | _                   |                     |
| PCB-093/098/100/102         |         | 3.25         |                | 3.3E-08                     |           | 4.68           |                | 4.7E-08                              |               | 99.9             | 6.7E             | -08                             | -1.2         |          | -1.2E-08                    |                     | -3.7        |               | -3.7E-08            |                     |
| PCB-088/091                 |         | 10.1         | 1              | 1.0E-07                     |           | 15.9           |                | 1.6E-07                              |               | 26.4             | 2.6E             | -07                             | -1.2         |          | -1.2E-08                    |                     | -3.8        |               | -3.8E-08            |                     |
| PCB-084                     |         | 19.5         |                | 2.0E-07                     |           | -2.1           |                | 3.3E-07                              |               | 0.20             | -2.0E            | 70-                             | 4.1-         |          | -1.4E-08                    |                     | -10         |               | -1.0E-07            |                     |
| PCB-121                     |         | -0.73        |                | -7.3E-09                    |           | 1.4            |                | 1.4E-08                              |               | -1.3             | -1.3E            | -08                             | -0.91        |          | -9.1E-09                    |                     | -2.8        |               | -2.8E-08            |                     |
| PCB-092                     |         | 12.9         |                | 1.3E-07                     |           | 24.9           |                | 2.5E-07                              |               | 43.1             | 4.3E-07          | -07                             | -1.3         |          | -1.3E-08                    |                     | -4.2        |               | -4.2E-08            |                     |
| PCB-090/101/113             |         | 77.5         |                | 7.8E-07                     |           | 144            |                | 1.4E-06                              |               | 242              | 2.4E             | 90-                             | 2.25         |          | 2.3E-08                     |                     | 26.5        |               | 4.8E-07             |                     |
| PCB-112                     |         | 72.0-        |                | 4.3E-07<br>-7.7E-09         |           | -17            |                | 1.7E-07                              |               | 4.1-             | -1.4E            | 80-                             | 96:0-        |          | -9.6E-09                    |                     | C.02        |               | -3.0E-08            |                     |
| PCB-086/087/097/109/119/125 |         | 65.4         |                | 6.5E-07                     |           | 119            |                | 1.2E-06                              |               | 172              | 1.7E             | 90-                             | -1.1         |          | -1.1E-08                    |                     | 45.2        |               | 4.5E-07             |                     |
| PCB-085/110/115/116/117     |         | 136          |                | 1.4E-06                     |           | 266            |                | 2.7E-06                              |               | 328              | 3.3E             | 90-00                           | -2.5         |          | -2.5E-08                    |                     | 96.7        |               | 9.7E-07             |                     |
| PCB-082                     |         | -0.79        |                | 1.5E-07<br>-7.9F-09         |           | -1.5           | <u> </u>       | -2.4E-07                             |               | -14              | 2.8E-07          | /0-                             | 8.T-<br>0.98 |          | -1.8E-08                    |                     | -3.1        |               | -1.2E-07            |                     |
| PCB-120                     |         | -0.78        |                | -7.8E-09                    |           | -1.5           |                | -1.5E-08                             |               | -1.4             | -1.4E-08         | 80-                             | -0.98        |          | -9.8E-09                    |                     | - 6-        |               | -3.0E-08            |                     |
| PCB-108/124                 |         | 3.13         |                | 3.1E-08                     |           | 7.13           |                | 7.1E-08                              |               | -8.1             | -8.1E            | -08                             | -1.2         |          | -1.2E-08                    |                     | -4.3        |               | -4.3E-08            |                     |
| _                           |         |              | $\Box$         | -4.6E-08                    |           | 9.48           |                |                                      |               |                  | ∃6:6-            | $\perp$                         | -1.1         |          | -1.1E-08                    |                     | -5.8        |               |                     | 1                   |
| PCB-105 0.0                 | 0.00003 | _            | 0.001344       | NA<br>NA                    | 1.34E-11  | 63             | 0.00189        | NA 1.                                | 1.89E-11      | 68.7 0.00206     | 700              | NA 2.06E-1                      | 1 -1.4       | -4.2E-05 | NA<br>NA                    | -4.20E-13           | -33         | -0.00099      | NA FF               | -9.90E-12           |
|                             | 0 00003 | 2.55.7       | 7 65E-05       | -1.1E-U0                    | 7 65E-13  | -3.2           | -9 6F-05       | _                                    | -9 60E-13     | 5 73 0 000172    | -Z:0E            | -06<br>NA 172E-12               | -1.3         | -3 9E-05 |                             | -3 90F-13           | t. 4        | -0.00013      | _                   | -1 26E-12           |
| PCB-122                     |         |              |                | -1.2E-08                    | 2         |                |                |                                      | 2             |                  | -2.1E            |                                 |              |          | -1.4E                       | 2000                | 4.8         | 2             |                     | 1 102:1             |
|                             | .00003  | _            | 0.002928       | _                           | 2.93E-11  | 165            | 0.00495        | NA<br>4                              | 95E-11        | 196 0.00588      | 4                |                                 |              | -3.9E-05 |                             | -3.90E-13           | 89.4        | 0.002682      | NA                  | 2.68E-11            |
|                             | 0.00003 |              | 5.28E-05       | NA                          | 5.28E-13  | -2.8           | -8.4E-05       | NA -8.                               | -8.40E-13     | 2.61 7.83E-05    |                  | NA 7.83E-13                     |              | -3.9E-05 | NA                          | -3.90E-13           | -4.4        | -0.00013      | NA                  | -1.32E-12           |
| PCB-127                     |         | -1.1         | 4              | -1.1E-08                    |           | -2.3           |                |                                      |               |                  | -2.1E            |                                 |              |          | -1.3E-08                    |                     | -4.7        |               |                     |                     |
| PCB-126                     | 0.1     | -2.1         | -0.21          | NA C                        | -2.10E-09 | -2.7           | -0.27          |                                      | -2.70E-09     |                  | -0.26            | NA -2.60E-09                    |              | -0.17    | AN L                        | -1.70E-09           | -7.6        | -0.76         |                     | -7.60E-09           |
| PCB-155                     |         | -2.4<br>-0.4 |                | -2.4E-08                    |           | -0.54<br>-0.38 |                | -5.4E-09                             |               | -0.72            | -7.2E-09         | 60-                             | -0.44        |          | -4.4E-09                    |                     | -2.3        |               | -2.3E-08            |                     |
| PCB-150                     |         | -0.39        |                | -3.9E-09                    |           | -0.36          |                | 3.6E-09                              |               | -0.43            | 4.3E             | 60-                             | -0.51        |          | -5.7E-09                    |                     | 1-1-        |               | -1.1E-08            |                     |
| PCB-136                     |         | 9.67         |                | 9.7E-08                     |           | -17            |                | -1.7E-07                             |               | 30.5             | 3.1E-07          | -07                             | -0.55        |          | -5.5E-09                    |                     | -6.2        |               | -6.2E-08            |                     |
| PCB-145                     |         | -0.42        |                | -4.2E-09                    |           | -0.39          |                | 3.9E-09                              |               | -0.47            | -4.7E-09         | 60-                             | -0.55        |          | -5.5E-09                    |                     | -1.2        |               | -1.2E-08            |                     |
| PCB-148                     |         | 9.0-         |                | -6.0E-09                    |           | -0.55          |                | -5.5E-09                             |               | -0.66            | -6.6E-09         | -09                             | -0.78        |          | -7.8E-09                    |                     | -1.7        |               | -1.7E-08            |                     |
| PCB-154                     |         | -0.49        |                | -4.9E-09                    |           | -0.72          |                | 7.2E-09                              |               | -0.54            | -5.4E            | 60-                             | -0.65        |          | -6.5E-09                    |                     | 4.1-        |               | -1.4E-08            |                     |
| PCB-144                     |         | 3.69         |                | 3.7E-08                     |           | 9.9-           | '              | -6.6E-08                             |               | 10.5             | 1.1E-07          | -07                             | -0.84        |          | -8.4E-09                    |                     | 3.21        |               | 3.2E-08             |                     |
| PCB-147/149                 |         | 84.9         |                | 8.5E-07                     |           | 158            |                | 1.6E-06                              |               | 190              | 1.9E             | 90-                             | -1.9         |          | -1.9E-08                    |                     | 99          |               | 6.6E-07             |                     |
| PCB-134/143                 |         | 5.77         |                | 5.8E-08                     |           | -10            | <u>'</u>       | 1.0E-07                              |               | -12              | -1.2E            | -07                             | -0.97        |          | -9.7E-09                    |                     | -6.5        |               | -6.5E-08            |                     |
| PCB-139/140                 |         | 2.7          |                | 2.7E-08                     |           | 4.13           |                | 4.1E-08                              |               | -5.3             | -5.3E            | 80-                             | -0.8         |          | -8.0E-09                    |                     | -5.4        |               | -5.4E-08            |                     |
| PCB-131                     |         | 7 1.         |                | -1.2E-08                    |           | 5.1-           |                | 2.9E-08                              |               | 4 L              | 4 4.3F           | 80,08                           | - 26:0-      |          | -1.0E-08                    |                     | 7 9         |               | -6.5F-08            |                     |
| PCB-132                     |         | 45.3         |                | 4.5E-07                     |           | 6.97           |                | 7.7E-07                              |               | 84.6             | 8.5E             | -07                             | 96.0-        |          | -9.6E-09                    |                     | -30         |               | -3.0E-07            |                     |
| PCB-133                     |         | -1.1         |                | -1.1E-08                    |           | -1.9           |                | 1.9E-08                              |               | -1.9             | -1.9E            | -08                             | -0.92        |          | -9.2E-09                    |                     | -6.2        |               | -6.2E-08            |                     |
| PCB-165                     |         | -0.82        |                | -8.2E-09                    |           | -1.1           |                | 1.1E-08                              |               | -0.93            | -9.3E            | 60-                             | -0.71        |          | -7.1E-09                    |                     | -4.8        |               | -4.8E-08            |                     |
| PCB-146                     |         | 13.5         |                | 1.4E-07                     |           | 21.9           |                | 2.2E-07                              |               | 22               | 2.2E             | -07                             | 9.0-         |          | -8.0E-09                    |                     | 14.5        | Ì             | 1.5E-07             |                     |
| PCB-161                     |         | 97.0-        |                | -7.8E-09                    |           | 135            |                | 1.1E-08<br>1.4E-06                   |               | 134              | -8.9E            | 80-                             | 1 73         |          | -6.8E-09                    |                     | 79          |               | -4.bE-U8<br>7.9E-07 |                     |
| PCB-141                     |         | 24.3         |                | 2.4E-07                     |           | 40             |                | 4.0E-07                              |               | 38.5             | 3.9E             | -07                             | -0.93        |          | -9.3E-09                    |                     | -21         |               | -2.1E-07            |                     |
| PCB-130                     |         | -7.4         |                | -7.4E-08                    |           | -14            |                | 1.4E-07                              |               | 15.6             | 1.6E             | -07                             | -1.1         |          | -1.1E-08                    |                     | 10.1        |               | 1.0E-07             |                     |
| PCB-137/164                 |         | 15.9         |                | 1.6E-07                     |           | 26.8           |                | 2.7E-07                              |               | 26.3             | 2.6E-07          | 20-                             | -0.81        |          | -8.1E-09                    |                     | -14         |               | -1.4E-07            |                     |
| PCB-129/138/183             |         | -0.86        |                | -8 6F-09                    |           | -12            | <del> </del>   | 2.3E-06<br>1.2E-08                   | -             | -0 98            | -9.8F            | 90-                             | -0.75        |          | -1.3E-00<br>-7.5F-09        |                     | 12 5        |               | -5.0F-08            |                     |
| PCB-158                     |         | 14.6         |                | 1.5E-07                     |           | 22             |                | 2.2E-07                              |               | 21.1             | 2.1E-07          | -07                             | -0.61        |          | -6.1E-09                    |                     | -13         |               | -1.3E-07            |                     |
| PCB-128/166                 |         | 20.7         |                | 2.1E-07                     |           | 33.8           |                | 3.4E-07                              |               | 27.1             | 2.7E-07          | -07                             | -0.83        |          | -8.3E-09                    |                     | 20.7        |               | 2.1E-07             |                     |
| PCB-159                     |         | -0.82        |                | -8.2E-09                    |           | 1.4            |                | 1.4E-08                              |               | -0 98            | -1.0E            | 80-00                           | -0.71        |          | -7.1E-09                    |                     | 4<br>80. rd |               | -4.8E-08            |                     |
|                             | 0.00003 | 13.5         |                | -o.oe-US                    | 4.05F-12  | 17             | 0.00051        | NA 5                                 | 5.10F-12      | 14.3 0.000429    | -9.0E            | NA 4.29F-12                     | -0.7         | -2.7F-05 | -7-14-7-<br>AN              | -2.70F-13           |             |               | -5.0E-00            | 4.02F-12            |
|                             | .00003  | _            | 0.000156       | A N                         | 1.56E-12  | -7.5           | 0.00023        |                                      | 25E-12        | ٦                |                  | 7                               |              |          |                             | -1.95E-13           | 5.41        | 0.000162      | AN                  | 1.62E-12            |
|                             | 0.03    | -0.84        |                | AN                          | -2.52E-10 | 1-             | -0.03          |                                      | -3.00E-10     |                  | -0.0252          | NA -2.52E-10                    |              | -0.0237  |                             | -2.37E-10           |             |               | NA                  | 1.20E-09            |
| PCB-188                     |         | -0.77        |                | -7.7E-09                    |           | -1.2           |                | 1.2E-08                              |               | -0.93            | -9.3E            | 60-                             | -0.54        |          | -5.4E-09                    |                     | -2.9        |               | -2.9E-08            |                     |
| PCB-179                     |         | 8.09         |                | 8.1E-08                     |           | -9.1           |                | 9.1E-08                              |               | 14.2             | 1.4E             | -07                             | -0.58        |          | -5.9E-09                    |                     | -6.1        |               | -6.1E-08            |                     |
| PCB-184                     |         | -3           |                | -3.0E-08                    |           | -0.94          |                | 9.4E-09                              | $\frac{1}{1}$ | 2 72             | -6.6E            | 60-                             | -0.53        |          | -5.3E-09                    |                     | -1.8        |               | -1.8E-08            |                     |
| PCB-176                     |         | -0.86        |                | 2.8E-09                     |           | -1.1           | 1              | 3.9E-08                              |               | -0.77            | 3.7E             | 60-                             | -0.61        |          | -6.0E-09                    |                     | -2.1        |               | -2.1E-08            |                     |
| PCB-178                     |         | 5.18         |                | 5.2E-08                     |           | 9.9-           |                | 9.6E-08                              |               | 4.8              | -4.8E            | 80-                             | -0.9         |          | -9.0E-09                    |                     | -3.2        |               | -3.2E-08            |                     |
| PCB-175                     |         | -1.3         |                | -1.3E-08                    |           | -1.6           |                | 1.6E-08                              |               | -1.1             | -1.1E            | 80-                             | 5.0-         |          | -9.0E-09                    |                     | -3.1        |               | -3.1E-08            |                     |
| PCB-187                     |         | 24.4         |                | 2.4E-07                     |           | 38.8           |                | 3.9E-07                              | 1             | 36.2             | 3.6E             | -07                             | -0.77        |          | -7.7E-09                    |                     | 32.7        |               | 3.3E-07             |                     |
| PCB-182                     |         | 15.1         |                | -1.2E-08<br>1.5F-07         |           | 16.9           |                | 1.5E-08                              |               | 13.5             | -1.1E            | -0.5                            | -0.84        |          | -8.4E-09                    |                     | 6.8         |               | -2.9E-08            |                     |
| PCB-185                     |         | -1.2         |                | -1.2E-08                    | T         | 2.86           |                | 2.9E-08                              |               | -1.6             | -1.6E-08         | -08                             | -0.86        |          | -8.6E-09                    |                     | 6-          |               | -3.0E-08            |                     |
|                             |         |              |                |                             |           |                |                |                                      |               | -                |                  |                                 | -            |          |                             | *                   | •           | •             |                     |                     |

| Montace between   Fig. 12   Montace between                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The column   The |                                                                   |           |       | ENG-558-DFP-02 | )FP-02   |           |       | ENG-583-DFP-02 | JFP-02   |          |       | ENG-168-DFP-01 | FP-01    |        |       | DFP-BLANK |       |      | EN   | ENG-159-DFP-1 | :P-1   |         |
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| Table   1903   1904   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Title   Citation   C |                                                                   |           |       |                |          |           | Be    | _              |          |          |       |                |          |        |       |           |       |      |      | _             |        | CB TE   |
| 12   12   12   12   12   12   12   12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sample Name                                                       | TEF       |       |                |          |           | ŝ     |                |          | _        |       |                |          |        |       |           |       |      |      |               |        | "mɔ/br  |
| 1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1   1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12   13E-04   1.0E-07    | PCB-174                                                           |           | 23.3  |                | 2.3E-07  |           | 29.5  |                |          |          | -23   |                | _        |        | .0.91 | -6-       |       |      | -21  | -5            | .1E-07 |         |
| 1.1   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1   2   2   2   2   2   2   2   2   2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-177                                                           |           | 12.7  |                | 1.3E-07  |           | -13   |                | -1.3E-07 |          | 14.7  |                | 1.5E-07  |        | 96.0- | -6.       | €-09  |      | 13.9 | 1             | .4E-07 |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Com | PCB-181                                                           |           | -1.3  |                | -1.3E-08 |           | -1.6  |                | -1.6E-08 |          | -1.1  |                | ·1.1E-08 |        | -0.9  | -6-       | E-09  |      | -3.2 | -3            | .2E-08 |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-171/173                                                       |           | -6.3  |                | -6.3E-08 |           | -8.5  |                | -8.5E-08 |          | 9.55  |                | 9.6E-08  |        | -0.99 | 6-        | €-09  |      | 10   | 1             | .0E-07 |         |
| 1   1   1   1   2   2   2   2   2   2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 11   11   11   11   11   11   11   1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PCB-172                                                           |           | -4.2  |                | -4.2E-08 |           | 9.11  |                | 9.1E-08  |          | -2.9  | _              | .2.9E-08 |        | 66.0- | -6-       | €-09  |      | -3.6 | -3            | 90-39° |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-192                                                           |           | -1.1  |                | -1.1E-08 |           | -1.4  |                | -1.4E-08 |          | -0.95 |                | 9.5E-09  |        | 97.0  | -7.       | €0-∃t |      | -2.7 | -2            | .7E-08 |         |
| 17.3   17.6 Cm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 17.2   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6    | PCB-180/193                                                       |           | 45.4  |                | 4.5E-07  |           | 64.8  |                | 6.5E-07  |          | 53.6  |                | 5.4E-07  |        | 0.75  | -7.       | 60-3  |      | -63  | 9-            | .3E-07 |         |
| 1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10   1,10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 17.5   17.6   17.6   17.6   17.6   17.6   18.6   17.6   18.6   17.6   18.6   17.6   18.6   17.6   18.6   17.6   18.6   17.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6   18.6  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| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-170                                                           |           | 17.3  |                | 1.7E-07  |           | 20.5  |                | 2.1E-07  |          | 17.9  |                | 1.8E-07  |        | .0.75 | -7.:      | iE-09 |      | 22.2 | 2             | .2E-07 |         |
| 1   2   2   2   2   2   2   2   2   2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-190                                                           |           | 3.09  |                | 3.1E-08  |           | -3.1  |                | -3.1E-08 |          | 2.96  |                | 3.0E-08  |        | .0.47 | 4-        | 'E-09 |      | 3.92 | 3             | .9E-08 |         |
| 2         3         7         4         4         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6         6        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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-189                                                           | 0.00003   | -1.2  | -3.6E-05       |          | -3.60E-13 | 9.0-  | -1.8E-05       |          | 1.80E-13 |       | .2.1E-05       |          |        |       | 5E-05     |       |      |      | 3E-05         |        | 3.30E-1 |
| 1.8   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18   1.18  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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-202                                                           |           | -2.7  |                | _        |           | -7.4  |                | -7.4E-08 |          | 9.47  |                | 9.5E-08  |        |       |           | €-09  |      | 7.83 | 7             | .8E-08 |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 7         0.5T         0.5T         0.85         0.85         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.86         0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PCB-204                                                           |           | -0.58 |                | -5.8E-09 |           | -0.87 |                | -8.7E-09 |          | 6.0-  |                | 9.0E-09  |        | 6.0-  | ·6-       | E-09  |      | -2.5 | -5            | .5E-08 |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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 1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15   1.15    | PCB-197                                                           |           | -0.57 |                | -5.7E-09 |           | -0.85 |                | -8.5E-09 |          | -0.88 |                | 8.8E-09  |        | .0.88 | 38        | ₹E-09 |      | -2.5 | -2            | .5E-08 |         |
| See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   See   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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | PCB-200                                                           |           | -1.3  |                | -1.3E-08 |           | -1.7  |                | -1.7E-08 |          | -2.6  | _              | ·2.6E-08 |        | -0.92 | -6        | E-09  |      | -2.6 | -2            | .6E-08 |         |
| 6         2.5         5.5E-08         4.3         4.3E-08         7.2E-08         -0.86         -0.86E-09         8.55         9.5E-09         9.55         9.5E-09         9.55         9.5E-09         9.55         9.5E-09         9.5E-09 <th< td=""><td>  Color   Colo</td><td>PCB-198/199</td><td></td><td>8.94</td><td></td><td>8.9E-08</td><td></td><td>14.8</td><td></td><td>1.5E-07</td><td></td><td>12.9</td><td></td><td>1.3E-07</td><td></td><td>-0.88</td><td>-8.</td><td>€-09</td><td></td><td>20.2</td><td>2</td><td>.0E-07</td><td></td></th<> | Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Colo | PCB-198/199                                                       |           | 8.94  |                | 8.9E-08  |           | 14.8  |                | 1.5E-07  |          | 12.9  |                | 1.3E-07  |        | -0.88 | -8.       | €-09  |      | 20.2 | 2             | .0E-07 |         |
| 2   5   5   5   5   5   5   5   5   5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3   5   5   5   5   5   5   5   5   5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-196                                                           |           | -2.6  |                | -2.6E-08 |           | -4.3  |                | -4.3E-08 |          | 4     | -              | -4.0E-08 |        | -0.86 | -8.       | €-09  |      | 6.35 | 9             | .4E-08 |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCB-203                                                           |           | 5.15  |                | 5.2E-08  |           | 10.1  |                | 1.0E-07  |          | -7.2  |                | .7.2E-08 |        | -0.85 | -8-       | €-09  |      | 90.6 | 6             | .1E-08 |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4   271   27-08   14   14E-07   12E-07   12E-07   12E-08   14E-08   14E-07   14E-08   14E-0 | PCB-195                                                           |           | -3.2  |                | -3.2E-08 |           | 3.17  |                | 3.2E-08  |          | 3.21  |                | 3.2E-08  |        | -0.71 | -7.       | 1E-09 |      | -3   | 6-            | .0E-08 |         |
| Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color  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Color   Color   Color   Color   Color   Colo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   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| S   S   S   S   S   S   S   S   S   S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | S   S   S   S   S   S   S   S   S   S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PCB-205                                                           |           | 92.0- |                | -7.6E-09 |           | 92.0- |                | -7.6E-09 |          | -0.84 |                | ·8.4E-09 |        | -0.68 | -6.       | €-09  |      | -1.6 | 1-            | .6E-08 |         |
| 1.2   1.2   1.2   1.2   1.2   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3   1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 126   126   126   126   126   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   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 127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127   127  | PCB-208                                                           |           | 5.19  |                | 5.2E-08  |           | 9.77  |                | 9.8E-08  |          | 7.88  |                | 7.9E-08  |        | -1.6  | -1,       | ìE-08 |      | 23   | 2             | .3E-07 |         |
| 12.1   12.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6   17.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 12.1   12.1.0   16.6   17.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1.0   1.1. | PCB-207                                                           |           | -2.6  |                | -2.6E-08 |           | -5    |                | -5.0E-08 |          | -2.7  | -              | -2.7E-08 |        | -1.7  | ή.        | 7E-08 |      | -11  | -1            | .1E-07 |         |
| 1.0E-06   1.14E-06   1.13E-06   59.5   6.0E-07   Rejected   1.13E-06   1.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page   Page    | PCB-206                                                           |           | 12.1  |                | 1.2E-07  |           | 16.6  |                | 1.7E-07  |          | -10   |                | 1.0E-07  |        | 4.75  | 4.,       | 3E-08 |      | 31.9 | 3             | .2E-07 |         |
| 4         -10E-06         -14E-06         -13E-06         -13E-06         60E-07         12E-06         13E-06         13E-06 </td <td>eg         -10E-06         -14F-06         -14F-06         -13E-06         60E-07         60E-07         12E-06         12E-06&lt;</td> <td></td> <td>S O</td> <td>pat</td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | eg         -10E-06         -14F-06         -14F-06         -13E-06         60E-07         60E-07         12E-06         12E-06<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                   |           |       |                |          |           |       |                |          |          |       |                |          |        |       |           |       | S O  | pat  |               |        |         |
| column         2.7E-05         3.4E-05         3.1E-05         1.2E-06         1.9E-05         1.9E-05           column         3.0E-05         3.0E-05         3.3E-05         3.2E-05         2.0E-06         2.0E-06         2.0E-06           column         4.0E-01         3.0E-05         3.0E-05         2.0E-06         2.0E-05         2.0E-05           column         4.12E-09         1.0E-09         1.0E-09         0.0E+00         0.0E+00         0.0E+00         0.0E+00           adjustiment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar   Secolar  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| adjustment         3.0E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | adjustment         3.0E-05         3.0E-05         3.0E-05         3.0E-05         9.0E-11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Non-TEQ PCBs (ND = 1/2 DL)*                                       |           |       |                | 2.9E-05  |           |       |                | 3.6E-05  |          |       |                | 3.3E-05  |        |       | 2.        | 90-3u |      |      | 2             | .3E-05 |         |
| lection         6.4E-11         9.0E-10         8.6E-11         0.0E+00         0.0E+00           1.2E-09         1.5E-09         9.7E-10         0           1.5E-09         1.9E-09         0           1.5E-09         1.9E-09         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Contracted   Con | Non-TEQ PCBs (ND = DL)                                            |           |       |                | 3.0E-05  |           |       |                | 3.9E-05  |          |       |                |          |        |       | 2.        |       |      |      | 2             | .6E-05 |         |
| tection         1.2E-09         1.6E-09         9.7E-10         9.7E-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | tection         1.2E-09         1.6E-09         1.5E-09         1.5E-09 <t< td=""><td>Lower Bound PCB TEQ (ND = 0)</td><td></td><td></td><td></td><td></td><td>6.4E-11</td><td></td><td></td><td></td><td>9.0E-11</td><td></td><td></td><td>8</td><td>.6E-11</td><td></td><td></td><td>0.0</td><td>E+00</td><td></td><td></td><td></td><td>3.2E-1</td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Lower Bound PCB TEQ (ND = 0)                                      |           |       |                |          | 6.4E-11   |       |                |          | 9.0E-11  |       |                | 8        | .6E-11 |       |           | 0.0   | E+00 |      |               |        | 3.2E-1  |
| adjustment 2.4E-09 3.1E-09 3.0E-09 1.3E-09 1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.4E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Mid Point PCB TEQ (ND = 1/2 DL)*                                  |           |       |                |          | 1.2E-09   |       |                |          | 1.6E-09  |       |                | 1        | .5E-09 |       |           | 9.7   | E-10 |      |               |        | 4.4E-C  |
| sss than the detection<br>dicate a blank adjustment<br>pendix C).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | sss than the detection  dicate a blank adjustment  pendix C).  biles  s; POB TEQ calculated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Upper Bound PCB TEQ (ND = DL)                                     |           |       |                |          | 2.4E-09   |       |                |          | 3.1E-09  |       |                | 3        | .0E-09 |       |           | 1.5   | E-09 |      |               |        | 8.9E-C  |
| Highlighted cells indicate a blank adjustment was made (see Appendix C).  = used in report tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Highighted cells indicate a blank adjustment Highighted cells indicate a blank adjustment Highighted cells indicate a blank adjustment  Highighted cells indicate a blank adjustment  * = used in report tables  NA = not applicable; PCB TEO calculated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Notes/Abbreviations "-" = "<" (reported less than the detections. | ction     |       |                |          |           |       |                |          |          |       |                |          |        |       |           |       |      |      |               |        |         |
| was made lee Appenda C  * Lesed in report lates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | *** See Appendix C.)  ** as made (see Appendix C.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Highlighted cells indicate a blank ad                             | Jinstment |       |                |          |           |       |                |          |          |       |                |          |        |       |           |       |      |      |               |        |         |
| = Lesd in reportations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | " = used in report tables<br>NA = not applicable; PCB TEQ calculated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | was made (see Appendix C).                                        |           |       |                |          |           |       |                |          |          |       |                |          |        |       |           |       |      |      |               |        |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NA = not applicable, PCB   EC calculated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | = used in report tables                                           |           |       |                |          |           |       |                |          |          |       |                |          |        |       |           |       |      |      |               |        |         |

| Sample Name PCB-001 PCB-002 PCB-003 PCB-003 PCB-010 PCB-010 PCB-010 PCB-010 PCB-010 PCB-010 PCB-010 PCB-010 |         |            |          | Non-TEQ  |           |          |          | OHT-UON  |           |
|-------------------------------------------------------------------------------------------------------------|---------|------------|----------|----------|-----------|----------|----------|----------|-----------|
|                                                                                                             | TEF All | All PCBs F | PCB TEQ  | PCBs     | PCB TEQ   | All PCBs | PCB TEQ  | PCBs     | PCB TEQ   |
| PCB-003<br>PCB-004<br>PCB-010<br>PCB-010<br>PCB-010<br>PCB-009<br>PCB-006                                   | 1       | 16.0       | (PS)     | 1 75 07  | (o.6d)    | (PS)     | (RA)     | 80 32 V  | / moded)  |
| PCB-003<br>PCB-004<br>PCB-010<br>PCB-010<br>PCB-007<br>PCB-007                                              |         | 70.5       |          | 7.1E-07  |           | 33.6     |          | 3.4F-07  |           |
| PCB-004<br>PCB-010<br>PCB-010<br>PCB-009<br>PCB-007                                                         |         | 6 69       |          | 7.0E-07  |           | -22      |          | -2 2F-07 |           |
| PCB-010<br>PCB-009<br>PCB-007<br>PCB-006                                                                    |         | -12        |          | -1 2F-07 |           | -5.2     |          | -5 2E-08 |           |
| PCB-009<br>PCB-007<br>PCB-006                                                                               |         | 6 6-       |          | -2 9E-08 |           | -3.2     |          | -3 2E-08 |           |
| PCB-007<br>PCB-007                                                                                          |         | ۳,         |          | -3 0F-08 |           | -3.2     |          | -3 2E-08 |           |
| PCB-006                                                                                                     |         | 10.8       |          | 1.1E-07  |           | -3.1     |          | -3.1E-08 |           |
|                                                                                                             |         | -13        |          | -1.3F-07 |           | C C-     |          | 80-38 E- |           |
| PCB-005                                                                                                     |         | 3.5        |          | -3.5F-08 |           | -3.7     |          | -3 7E-08 |           |
| 500-GO  <br>BOB-U08                                                                                         |         | 17.1       |          | 4 7E-07  |           | 1.0-     |          | 00-17-0- |           |
| PCB-014                                                                                                     |         | 200        |          | -2 RE-08 |           | N C-     |          | 2.2E 08  |           |
| 100000                                                                                                      |         | 0.2        |          | 9 0E 06  |           | 1400     |          | 4 AE OF  |           |
| 10B-011                                                                                                     |         | 460        |          | 0.9E-00  |           | 1400     |          | 00-34:1  |           |
| PCB-012/013                                                                                                 |         | 05-        |          | -3.0E-U/ |           | -2.4     |          | -Z.4E-U8 |           |
| PCB-015                                                                                                     |         | -42        |          | -4.2E-U/ |           | c.c-     |          | 80-3C-0- |           |
| PCB-019                                                                                                     |         | -3.9       |          | -3.9E-08 |           | -1.2     |          | -1.2E-08 |           |
| PCB-018/030                                                                                                 |         | 32.3       |          | 3.2E-07  |           | 6.9-     |          | -6.9E-08 |           |
| PCB-017                                                                                                     |         | 18.1       |          | 1.8E-07  |           | 3.6      |          | 3.6E-08  |           |
| PCB-027                                                                                                     |         | -2.3       |          | -2.3E-08 |           | -0.93    |          | -9.3E-09 |           |
| PCB-024                                                                                                     |         | -1.1       |          | -1.1E-08 |           | -0.94    |          | -9.4E-09 |           |
| PCB-016                                                                                                     |         | -15        |          | -1.5E-07 |           | -3.2     |          | -3.2E-08 |           |
| PCB-032                                                                                                     |         | 10.5       |          | 1.1E-07  |           | 3.07     |          | 3.1E-08  |           |
| PCB-034                                                                                                     |         | -1.2       |          | -1.2E-08 |           | 4.1-     |          | -1.4E-08 |           |
| PCB-023                                                                                                     |         | -1.1       |          | -1.1E-08 |           | -1.3     |          | -1.3E-08 |           |
| PCB-026/029                                                                                                 |         | -12        |          | -1 2F-07 |           | 3.39     |          | 3 4F-08  |           |
| PCB-025                                                                                                     |         | 1 2        |          | -8 5E-08 |           | -12      |          | -1 2F-08 |           |
| PCB-021                                                                                                     |         | 62.7       |          | 6.3E-07  |           | 7 1 1 7  |          | 1 2E 07  |           |
| 150-80-1                                                                                                    |         | 7007       |          | 7.000.07 |           | 101      |          | 10-371-  |           |
| PCB-020/028                                                                                                 |         | 6.07       |          | 7.9E-07  |           | 13.3     |          | 1.4E-07  |           |
| PCB-021/033                                                                                                 |         | nc-        |          | -5.0E-U/ |           | ρ.       |          | -8.0E-U8 |           |
| PCB-022                                                                                                     |         | 32.4       |          | 3.2E-07  |           | 5.33     |          | 5.3E-08  |           |
| PCB-036                                                                                                     |         | 16.6       |          | 1.7E-07  |           | -1.3     |          | -1.3E-08 |           |
| PCB-039                                                                                                     |         | -1.1       |          | -1.1E-08 |           | -1.3     |          | -1.3E-08 |           |
| PCB-038                                                                                                     |         | -1.2       |          | -1.2E-08 |           | -1.4     |          | -1.4E-08 |           |
| PCB-035                                                                                                     |         | 42.9       |          | 4.3E-07  |           | 12.1     |          | 1.2E-07  |           |
| PCB-037                                                                                                     |         | 67.7       |          | 6.8F-07  |           | 6.25     |          | 6.3E-08  |           |
| PCB-054                                                                                                     |         | 0 7 0      |          | -4 9E-09 |           | 0.56     |          | 60-39'S  |           |
| 1 CE-001                                                                                                    |         | 0.0        |          | 0.65.00  |           | 20.0     |          | 4 4 5 00 |           |
| FCB-030/033                                                                                                 |         | 0.00       |          | 0.0E-00  |           | - 1 -    |          | 44500    |           |
| PCB-043/031                                                                                                 |         | 6.17       |          | 1.1E-U1  |           | 4.4      |          | -4.4E-U8 |           |
| PCB-046                                                                                                     |         | 5.9        |          | -3.9E-08 |           | r.r-     |          | -1.1E-U8 |           |
| PCB-052                                                                                                     |         | 270        |          | 2.7E-06  |           | 26.9     |          | 2.7E-07  |           |
| PCB-073                                                                                                     |         | -0.56      |          | -5.6E-09 |           | -0.69    |          | -6.9E-09 |           |
| PCB-043                                                                                                     |         | -2.1       |          | -2.1E-08 |           | -1.2     |          | -1.2E-08 |           |
| PCB-049/069                                                                                                 |         | 79.7       |          | 8.0E-07  |           | 7.2      |          | 7.2E-08  |           |
| PCB-048                                                                                                     |         | 18.6       |          | 1.9E-07  |           | 1.77     |          | 1.8E-08  |           |
| PCB-044/047/065                                                                                             |         | 506        |          | 5.1E-06  |           | 28       |          | 2.8E-07  |           |
| PCB-059/062/075                                                                                             |         | 10.6       |          | 1.1E-07  |           | -0.73    |          | -7.3E-09 |           |
| PCB-042                                                                                                     |         | -25        |          | -2 5E-07 |           |          |          | 80-30 E- |           |
| BCB-040/041/071                                                                                             |         | 808        |          | 6.1E.07  |           | 9 0      |          | 80 B 9   |           |
| 1 (0) 4 (0) 6 (0)                                                                                           |         | 61.0       |          | 6.1E.07  |           | 7.7      |          | 6 7E 00  |           |
| 100-00-1                                                                                                    |         | 4 . 4      |          | 4.45.00  |           | 7.6-     |          | 20-77.6- |           |
| PCB-0/2                                                                                                     |         | - :        |          | -1.15-00 |           | 77.0-    |          | 80-37.7- |           |
| PCB-068                                                                                                     |         | 50.T       |          | 5.0E-U/  |           | 4.58     |          | 4.6E-U8  |           |
| PCB-05/                                                                                                     |         | -1.2       |          | -1.2E-08 |           | -0.82    |          | -8.2E-09 |           |
| PCB-058                                                                                                     |         | -1.1       |          | -1.1E-08 |           | -0.75    |          | -7.5E-09 |           |
| PCB-067                                                                                                     |         | -2.9       |          | -2.9E-08 |           | -0.71    |          | -7.1E-09 |           |
| PCB-063                                                                                                     |         | -4.8       |          | -4.8E-08 |           | -0.76    |          | -7.6E-09 |           |
| PCB-061/070/074/076                                                                                         |         | 419        |          | 4.2E-06  |           | 36.2     |          | 3.6E-07  |           |
| PCB-066                                                                                                     |         | 144        |          | 1.4E-06  |           | -12      |          | -1.2E-07 |           |
| PCB-055                                                                                                     |         | -1.2       |          | -1.2E-08 |           | -0.83    |          | -8.3E-09 |           |
| PCB-056                                                                                                     |         | 62.5       |          | 6.3F-07  |           | 6-       |          | -9 0F-08 |           |
| DCB-060                                                                                                     |         | 38         |          | 3 8E-07  |           | 381      |          | 3.8E-08  |           |
| 020 20 1                                                                                                    |         | 3 5        |          | 1 OF OR  |           | 0.0      |          | 7 1E 09  |           |
| PCB-080                                                                                                     |         | - 0        |          | -1.05-00 |           | 0.76     |          | 60-31.1- |           |
| PCB-019                                                                                                     |         | 5.5        |          | 4 or on  |           | 0/-0-    |          | 60-30:7- |           |
| PCB-0/8                                                                                                     | 4 4     | ρ· :       |          | -1.8E-U8 |           |          |          |          |           |
| PCB-077                                                                                                     | 0.0001  | 47.1       | 0.00471  | NA       | 4.71E-11  | -5       |          | Y :      | -5.00E-12 |
| PCB-081                                                                                                     | 0.0003  | -1.4       | -0.00042 | NA       | -4.20E-12 |          | -0.00028 | NA       | -2.82E-12 |
| PCB-104                                                                                                     |         | -0.63      |          | -6.3E-09 |           | -0.59    |          | -5.9E-09 |           |
| PCB-096                                                                                                     |         | 2.54       |          | 2.5E-08  |           | -0.57    |          | 60-31'S- |           |
| PCB-103                                                                                                     |         | 2.39       |          | 2.4E-08  |           | -2.1     |          | -2.1E-08 |           |
| PCB-094                                                                                                     |         | 2.2        |          | 2 2E_08  |           | 2.7      |          | 2 4E_08  |           |

|                                          |         |             |          | Non-TEQ          |           |                   |          | Non-TEQ          |           |
|------------------------------------------|---------|-------------|----------|------------------|-----------|-------------------|----------|------------------|-----------|
| Sample Name                              | TEF     | All PCBs    | PCB TEQ  | PCBs<br>(ua/cm²) | PCB TEQ   | All PCBs          | PCB TEQ  | PCBs<br>(ua/cm²) | PCB TEQ   |
| PCB-095                                  |         | (F3)<br>475 | (PS)     | 4 RE-06          | (F3/6)    | 37.7              | (PS)     | 3 AE-07          | (         |
| PCB-093/098/100/103                      |         | 17.3        |          | 1.7E-07          |           | 1.10              |          | -23E-08          |           |
| PCB-088/089                              |         | 717         |          | 7.2E-07          |           | 6.44              |          | 6.4E-08          |           |
| PCB-084                                  |         | 163         |          | 1.5E-01          |           | 15.5              |          | 1 6F-07          |           |
| PCB-089                                  |         | -5.2        |          | -5.2E-08         |           | -2.6              |          | -2.6E-08         |           |
| PCB-12                                   |         | -1.6        |          | -1.6E-08         |           | -1.8              |          | -1.8E-08         |           |
| PCB-092                                  | 2       | 112         |          | 1.1E-06          |           | 10.4              |          | 1.0E-07          |           |
| PCB-090/101/113                          | 3       | 657         |          | 6.6E-06          |           | 57.6              |          | 5.8E-07          |           |
| PCB-083/099                              | 9       | 331         |          | 3.3E-06          |           | 31.1              |          | 3.1E-07          |           |
| PCB-112                                  | 2       | -7.4        |          | -7.4E-08         |           | -2.4              |          | -2.4E-08         |           |
| PCB-086/087/097/109/119/125              | 5       | 491         |          | 4.9E-06          |           | 50.3              |          | 5.0E-07          |           |
| PCB-085/110/115/116/117                  |         | 934         |          | 9.3E-06          |           | 123               |          | 1.2E-06          |           |
| PCB-082                                  | 0.1     | 87.8        |          | 8.8E-07          |           | 6'9-              |          | -6.9E-08         |           |
| PCB-11.                                  | -       | 9.1-        |          | -1.6E-08         |           | -1.8              |          | -1.8E-08         |           |
| PCB-12(                                  | 0       | -1.6        |          | -1.6E-08         |           | 29.5              |          | 3.0E-07          |           |
| PCB-108/12                               |         | 23.7        |          | 2.4E-07          |           | 4.4               |          | -4.4E-08         |           |
| PCB-107                                  |         | 30.6        |          | 3.1F-07          |           | -3.8              |          | -3 8F-08         |           |
| PCB-109                                  | 0.00003 | 182         | 0.00546  | NA               | 5.46E-11  | 32.7              | 0.000981 | AN               | 9.81E-12  |
| PCB-106                                  |         | -2.1        |          | -2.1E-08         |           | -4.5              | 1        | -4.5E-08         |           |
| PCB-117                                  | 0.00003 | -11         | -0.00033 | NA               | -3.30F-12 | 9 7-              | -0.00014 | ΨN               | -1.38F-12 |
| PCB-123                                  |         | 5.8-        |          | -8.5E-08         | 1         | 6 7-              |          | -4.9E-08         |           |
| PCB-118                                  |         | 524         | 0.01572  | AN               | _         |                   | 1        | AN               | _         |
| PCB-12                                   | 0.00003 | 101         | U        | NA               | 3.03E-12  |                   | -0.00015 | δN               | -1 47E-12 |
| PCB-12                                   |         | 6.67        | ,        | -2 2E-08         | 7         |                   |          | 80-39 V-         |           |
| DCB 136                                  | 0       | 2.2-        | 0.03     | NA NA            | 0 305 00  |                   | 0.58     | NA<br>NA         | 5 80E 00  |
| 121-20                                   |         | 5 4         |          | 1 1 1 00         |           |                   |          |                  |           |
| PCB-135                                  | 0.0     | 0.66        |          | -1.15-00         |           | 07.0-             |          | 60-30.7-         |           |
| 150-100-100-100-100-100-100-100-100-100- |         | CC.U-       |          | -3.3E-09         |           | ZC:0-             |          | 60-37:C-         |           |
| PCP-13(                                  |         | 0.000       |          | 0.7 E-09         |           | 0.0-              |          | -5.0E-09         |           |
| PCB-136                                  | 9       | 2.19        |          | 6.1E-07          |           | 8.52              |          | 8.5E-08          |           |
| PCB-14                                   | 0       | 16:0-       |          | -5.1E-09         |           | -0.54             |          | -5.4E-09         |           |
| PCB-148                                  | 2       | 17.0-       |          | -7.1E-09         |           | 97.0-             |          | -7.6E-09         |           |
| PCB-135/151                              |         | 139         |          | 1.4E-06          |           | 19.6              |          | 2.0E-07          |           |
| PCB-15                                   | †       | -0.58       |          | -5.8E-09         |           | -0.62             |          | -6.2E-09         |           |
| PCB-144                                  | #       | 22.3        |          | 2.2E-07          |           | 3.91              |          | 3.9E-08          |           |
| PCB-147/149                              | 9       | 353         |          | 3.5E-06          |           | 55.3              |          | 5.5E-07          |           |
| PCB-134/143                              | 3       | 31.5        |          | 3.2E-07          |           | 5.19              |          | 5.2E-08          |           |
| PCB-139/14(                              | 0       | 10.6        |          | 1.1E-07          |           | -1.6              |          | -1.6E-08         |           |
| PCB-13                                   | _       | 8.92        |          | 8.9E-08          |           | -2.1              |          | -2.1E-08         |           |
| PCB-142                                  | č       | -1.3        |          | -1.3E-08         |           | 7-                |          | -2.0E-08         |           |
| PCB-13                                   |         | 177         |          | 1.8E-06          |           | 32                |          | 3.2E-07          |           |
| PCB-133                                  |         | 5.15        |          | 5.2E-08          |           | -1.9              |          | -1.9E-08         |           |
| 20 - 20 - 20 - 20 - 20 - 20 - 20 - 20 -  |         | 90.0        |          | 9.5E 00          |           | 11                |          | 1 AE-08          |           |
| 10B-100                                  |         | -0.90       |          | -3.0E-03         |           | 40.6              |          | 1 1 5 07         |           |
| PCB-140                                  |         | 940         |          | -4.0E-U/         |           | 0.01              |          | 1.1E-U/          |           |
| PCB-161                                  |         | -0.92       |          | -9.2E-09         |           | 4.r-              |          | -1.4E-08         |           |
| PCB-153/168                              | 2       | 767         |          | 3.0E-06          |           | 61.4              |          | 6.1E-07          |           |
| PCB-147                                  |         | 75.5        |          | 7.6E-07          |           | 17.9              |          | 1.8E-07          |           |
| PCB-13(                                  | 0       | -24         |          | -2.4E-07         |           | 6.43              |          | 6.4E-08          |           |
| PCB-137/16 <sup>2</sup>                  | #       | 48.9        |          | 4.9E-07          |           | 13.6              |          | 1.4E-07          |           |
| PCB-129/138/163                          | 3       | 454         |          | 4.5E-06          |           | 117               |          | 1.2E-06          |           |
| PCB-16(                                  | )       | -0.93       |          | -9.3E-09         |           | -1.4              |          | -1.4E-08         |           |
| PCB-158                                  | 3       | -42         |          | -4.2E-07         |           | 11.4              |          | 1.1E-07          |           |
| PCB-128/166                              | 9       | 63.2        |          | 6.3E-07          |           | 17.9              |          | 1.8E-07          |           |
| PCB-158                                  | 6       | 7-          |          | -2.0E-08         |           | 68'9              |          | 5.4E-08          |           |
| PCB-162                                  |         |             |          |                  |           | -1.5              |          |                  |           |
| PCB-156/157                              | 0.00003 | 37.9        |          |                  | 1.14E-11  |                   | 0.00054  |                  | 5.40E-12  |
| PCB-167                                  |         |             |          |                  |           |                   |          |                  | -1.56E-12 |
| PCB-169                                  |         |             | -0.033   | NA               | -3.30E-10 |                   |          | ΥN               | 4.50E-10  |
| PCB-188                                  | 3       | -0.55       |          | -5.5E-09         |           | -1.3              |          | -1.3E-08         |           |
| PCB-179                                  | 9       | 25.3        |          | 2.5E-07          |           | 6.41              |          | 6.4E-08          |           |
| PCB-18                                   | -       | 1.7         |          | 1.7E-08          |           | <del>1</del> 6.0- |          | 60-34'6-         |           |
| PCB-176                                  | (0      | 8.24        |          | 8.2E-08          |           | 2.2               |          | 2.2E-08          |           |
| PCB-186                                  | (0      | -0.52       |          | -5.2E-09         |           | -1.1              |          | -1.1E-08         |           |
| PCB-178                                  |         | 12.5        |          | 1.3E-07          |           | 3.06              |          | 3.1E-08          |           |
| PCB-17                                   | 10      | 3.57        |          | 3.6E-08          |           | -1.6              |          | -1.6E-08         |           |
| PCB-18                                   |         | 737         |          | 7.4E-07          |           | 22.3              |          | 2 2E-07          |           |
| PCB-182                                  |         | -0.71       |          | -7.1E-09         |           | -1.5              |          | -1.5E-08         |           |
| 200                                      |         | ;           |          | 1.1-0-1          |           | !                 |          | ;                |           |
|                                          |         | 35          |          | 2 5E-07          |           | 111               |          | 1 1E_07          |           |

|                                  |         |          | ENG-583  | ENG-583-DFP-01 |           |          | ENG-558-DFP-01 | -DFP-01  |           |
|----------------------------------|---------|----------|----------|----------------|-----------|----------|----------------|----------|-----------|
|                                  |         |          |          | Non-TEQ        |           |          |                | Non-TEQ  |           |
|                                  |         | All PCBs | PCB TEQ  | PCBs           | PCB TEQ   | All PCBs | PCB TEQ        | PCBs     | PCB TEQ   |
| Sample Name                      | TEF     | (bd)     | (pg)     | (µg/cm²)       | (µg/cm²)  | (bd)     | (bd)           | (µg/cm²) | (µg/cm²)  |
| PCB-174                          |         | 50.3     |          | 5.0E-07        |           | 21.7     |                | 2.2E-07  |           |
| 177 PCB-177                      |         | 28.2     |          | 2.8E-07        |           | 11.4     |                | 1.1E-07  |           |
| PCB-181                          |         | -1       |          | -1.0E-08       |           | -1.6     |                | -1.6E-08 |           |
| PCB-171/173                      |         | 17       |          | 1.7E-07        |           | 7.4-     |                | -4.7E-08 |           |
| PCB-172                          |         | 9.8-     |          | -8.6E-08       |           | -2.6     |                | -2.6E-08 |           |
| PCB-192                          |         | -0.68    |          | -6.8E-09       |           | -1.4     |                | -1.4E-08 |           |
| PCB-180/193                      |         | 115      |          | 1.2E-06        |           | 204      |                | 2.0E-06  |           |
| PCB-191                          |         | -3.3     |          | -3.3E-08       |           | -1.3     |                | -1.3E-08 |           |
| PCB-170                          |         | 9.03     |          | 5.1E-07        |           | 34       |                | 3.4E-07  |           |
| PCB-190                          |         | 11.2     |          | 1.1E-07        |           | 5.83     |                | 5.8E-08  |           |
| PCB-189                          | 0.00003 | -1.9     | -5.7E-05 | NA             | -5.70E-13 | -1.3     | -3.9E-05       | NA       | -3.90E-13 |
| PCB-202                          |         | 18.5     |          | 1.9E-07        |           | -1.8     |                | -1.8E-08 |           |
| PCB-201                          |         | 5.88     |          | 5.9E-08        |           | 1.1-     |                | -1.1E-08 |           |
| PCB-204                          |         | -0.71    |          | -7.1E-09       |           | -1.1     |                | -1.1E-08 |           |
| PCB-197                          |         | 1-       |          | -1.0E-08       |           | ١-       |                | -1.0E-08 |           |
| PCB-200                          |         | 60.9     |          | 6.1E-08        |           | -1.1     |                | -1.1E-08 |           |
| PCB-198/199                      |         | 47       |          | 4.7E-07        |           | 16.9     |                | 1.7E-07  |           |
| PCB-196                          |         | 15.1     |          | 1.5E-07        |           | 6.8      |                | 6.8E-08  |           |
| PCB-203                          |         | 30.5     |          | 3.1E-07        |           | -8.4     |                | -8.4E-08 |           |
| PCB-195                          |         | 8.84     |          | 8.8E-08        |           | 4.78     |                | 4.8E-08  |           |
| PCB-194                          |         | 28.8     |          | 2.9E-07        |           | 17.9     |                | 1.8E-07  |           |
| PCB-205                          |         | -1.6     |          | -1.6E-08       |           | -1.1     |                | -1.1E-08 |           |
| PCB-208                          |         | 21.9     |          | 2.2E-07        |           | -5.3     |                | -5.3E-08 |           |
| PCB-207                          |         | 8.07     |          | 8.1E-08        |           | 4.4      |                | 4.4E-08  |           |
| PCB-206                          |         | 53.4     |          | 5.3E-07        |           | -21      |                | -2.1E-07 |           |
|                                  |         |          |          |                |           |          |                |          |           |
| PCB-209                          |         | -89.4    |          | -8.9E-07       |           | -218     |                | -2.2E-06 |           |
| Non-TEQ PCBs (ND = 0)            |         |          |          | 9.1E-05        |           |          |                | 2.7E-05  |           |
| Non-TEQ PCBs (ND = 1/2 DL)*      |         |          |          | 9.4E-05        |           |          |                | 3.0E-05  |           |
| Non-TEQ PCBs (ND = DL)           |         |          |          | 9.6E-05        |           |          |                | 3.2E-05  |           |
| Lower Bound PCB TEQ (ND = 0)     |         |          |          |                | 2.8E-10   |          |                |          | 1.5E-11   |
| Mid Point PCB TEQ (ND = 1/2 DL)* |         |          |          |                | 5.1E-09   |          |                |          | 3.2E-09   |
| Upper Bound PCB TEQ (ND = DL)    |         |          |          |                | 9.9E-09   |          |                |          | 6.3E-09   |

Notes/Abbreviations
"." = "-2" (reported less than the detection limit).
Highlighted cells indicate a blank adjustment was made (see Appendix C).
" = used in report tables
NA = not applicable; PCB TEQ calculated.

| Sample Name         |        | BA-1       | BA-2       | BA-3-BLANK | 356-4      | 356-5      |              | ENG-558-DFP-02 |
|---------------------|--------|------------|------------|------------|------------|------------|--------------|----------------|
| ALS Sample ID       |        | L2526958-1 | L2526958-2 | L2526958-3 | L2526958-4 | L2526958-5 |              | L2526958-6     |
| Target Analytes     | TEFs   | bd         | bd         | bd         | bd         | bd         | Qualifier    | bd             |
| 2,3,7,8-TCDD        | 1      | <1.2       | <1.4       | <1.0       | <0.92      | <1.1       |              | <1.1           |
| 1,2,3,7,8-PeCDD     | 1      | <0.88      | <2.1       | <0.77      | <0.75      | <0.97      |              | <1.0           |
| 1,2,3,4,7,8-HxCDD   | 0.1    | <1.3       | <2.8       | <0.74      | <0.68      | <1.2       |              | <1.1           |
| 1,2,3,6,7,8-HxCDD   | 0.1    | <1.1       | <2.6       | <0.65      | <0.59      | <1.1       |              | <1.0           |
| 1,2,3,7,8,9-HxCDD   | 0.1    | <1.1       | <3.2       | 99.0>      | 09.0>      | <1.1       |              | <1.0           |
| 1,2,3,4,6,7,8-HpCDD | 0.01   | 76.7       | <22        | <1.5       | <1.8       | <3.3       |              | 12.0           |
| aaoo                | 0.0003 | 35.6       | 95>        | <2.2       | <3.6       | <6.53 U    | non-detect U | 68.0           |
| 2,3,7,8-TCDF        | 0.1    | <1.2       | <1.5       | <1.0       | <0.89      | <1.1       |              | <0.93          |
| 1,2,3,7,8-PeCDF     | 0.03   | 20.0>      | <1.3       | <0.64      | 69.0>      | <0.63      |              | <0.87          |
| 2,3,4,7,8-PeCDF     | 0.3    | <0.73      | <0.97      | <0.47      | <0.55      | <0.49      |              | <0.70          |
| 1,2,3,4,7,8-HxCDF   | 0.1    | <1.0       | <2.1       | <0.45      | <0.53      | <0.71      |              | <0.71          |
| 1,2,3,6,7,8-HxCDF   | 0.1    | >0.86      | <1.9       | <0.43      | <0.49      | 99.0>      |              | <0.81          |
| 2,3,4,6,7,8-HxCDF   | 0.1    | <0.87      | <1.7       | <0.45      | <0.54      | <0.72      |              | <1.4           |
| 1,2,3,7,8,9-HxCDF   | 0.1    | <1.3       | <2.3       | <0.67      | 1.02       | <1.2       |              | <1.1           |
| 1,2,3,4,6,7,8-HpCDF | 0.01   | <3.1       | <4.3       | <1.3       | <1.1       | <1.2       |              | <4.7           |
| 1,2,3,4,7,8,9-HpCDF | 0.01   | <2.9       | <6.3       | <2.0       | <1.8       | <1.8       |              | <2.7           |
| OCDF                | 0.0003 | <5.2       | 12.0       | <2.3       | <3.3       | <4.6       |              | 11.0           |

Attachment 2-B. Dioxin/Furan TEQ Calculations

| Sample Name                 |                | P-VB       | BA-2       | <b>BA-3-BLANK</b> | 356-4      | 356-5      | ENG-558-DFP-02 |
|-----------------------------|----------------|------------|------------|-------------------|------------|------------|----------------|
| ALS Sample ID               |                | L2526958-1 | L2526958-2 | L2526958-3        | L2526958-4 | L2526958-5 | L2526958-6     |
| Target Analytes             | TEFs           | 6d         | bd         | bd                | bd         | bd         | pg             |
| 2,3,7,8-TCDD                | 1              | 9.0        | 2.0        | 0.5               | 0.46       | 0.55       | 0.55           |
| 1,2,3,7,8-PeCDD             | 1              | 74'0       | 1.05       | 0.385             | 0.375      | 0.485      | 0.5            |
| 1,2,3,4,7,8-HxCDD           | 0.1            | 90'0       | 0.14       | 0.037             | 0.034      | 90.0       | 0.055          |
| 1,2,3,6,7,8-HxCDD           | 0.1            | 950.0      | 0.13       | 0.0325            | 0.0295     | 0.055      | 90.0           |
| 1,2,3,7,8,9-HxCDD           | 0.1            | 0.055      | 0.16       | 0.033             | 0.03       | 0.055      | 0.05           |
| 1,2,3,4,6,7,8-HpCDD         | 0.01           | 2620'0     | 0.11       | 0.0075            | 600.0      | 0.0165     | 0.12           |
| OCDD                        | 0.0003         | 0.01068    | 0.0084     | 0.00033           | 0.00054    | 0.0009795  | 0.0204         |
| 2,3,7,8-TCDF                | 0.1            | 90'0       | 0.075      | 0.05              | 0.0445     | 0.055      | 0.0465         |
| 1,2,3,7,8-PeCDF             | 0.03           | 0.01455    | 0.0195     | 9600'0            | 0.01035    | 0.00945    | 0.01305        |
| 2,3,4,7,8-PeCDF             | 0.3            | 0.1095     | 0.1455     | 0.0705            | 0.0825     | 0.0735     | 0.105          |
| 1,2,3,4,7,8-HxCDF           | 0.1            | 90'0       | 0.105      | 0.0225            | 0.0265     | 0.0355     | 0.0355         |
| 1,2,3,6,7,8-HxCDF           | 0.1            | 0.043      | 960.0      | 0.0215            | 0.0245     | 0.033      | 0.0405         |
| 2,3,4,6,7,8-HxCDF           | 0.1            | 0.0435     | 0.085      | 0.0225            | 0.027      | 0.036      | 20.0           |
| 1,2,3,7,8,9-HxCDF           | 0.1            | 90'0       | 0.115      | 0.0335            | 0.102      | 90.0       | 0.055          |
| 1,2,3,4,6,7,8-HpCDF         | 0.01           | 0.0155     | 0.0215     | 0.0065            | 0.0055     | 900'0      | 0.0235         |
| 1,2,3,4,7,8,9-HpCDF         | 0.01           | 0.0145     | 0.0465     | 0.01              | 600.0      | 600.0      | 0.0135         |
| OCDF                        | 0.0003         | 0.00078    | 0.0036     | 0.000345          | 0.000495   | 0.00069    | 0.0033         |
| Total TEQ using 1/2 DL (pg) | DL (pg)        | 1.7E+00    | 3.0E+00    | 1.2E+00           | 1.3E+00    | 1.5E+00    | 1.8E+00        |
| Total TEQ using 1/2 DL (µg  | DL (µg)        | 1.7E-06    | 3.0E-06    | 1.2E-06           | 1.3E-06    | 1.5E-06    | 1.8E-06        |
| Total TEQ using 1/2 DL (    | /2 DL (µg/cm²) | 1.7E-08    | 3.0E-08    | 1.2E-08           | 1.3E-08    | 1.5E-08    | 1.8E-08        |
|                             |                |            |            |                   |            |            |                |

| Sample Name                 |                       | BA-1       | BA-2       | BA-3-BLANK | 356-4      | 356-5      | ENG-558-DFP-02 |
|-----------------------------|-----------------------|------------|------------|------------|------------|------------|----------------|
| ALS Sample ID               |                       | L2526958-1 | L2526958-2 | L2526958-3 | L2526958-4 | L2526958-5 | L2526958-6     |
| Target Analytes             | TEFs                  | 6d         | bd         | bd         | pg         | pg         | pg             |
| 2,3,7,8-TCDD                | 1                     | 1.2        | 1.4        |            | 0.92       | 1.1        | 1.1            |
| 1,2,3,7,8-PeCDD             | 1                     | 0.88       | 2.1        | 72.0       | 0.75       | 0.97       |                |
| 1,2,3,4,7,8-HxCDD           | 0.1                   | 0.13       | 0.28       | 0.074      | 0.068      | 0.12       | 0.11           |
| 1,2,3,6,7,8-HxCDD           | 0.1                   | 11.0       | 0.26       | 0.065      | 0.059      | 0.11       | 0.1            |
| 1,2,3,7,8,9-HxCDD           | 0.1                   | 11.0       | 0.32       | 990'0      | 90.0       | 0.11       | 0.1            |
| 1,2,3,4,6,7,8-HpCDD         | 0.01                  | 2620'0     | 0.22       | 0.015      | 0.018      | 0.033      | 0.12           |
| OCDD                        | 0.0003                | 0.01068    | 0.0168     | 99000'0    | 0.00108    | 0.001959   | 0.0204         |
| 2,3,7,8-TCDF                | 0.1                   | 0.12       | 0.15       | 0.1        | 0.089      | 0.11       | 0.093          |
| 1,2,3,7,8-PeCDF             | 0.03                  | 0.0291     | 0.039      | 0.0192     | 0.0207     | 0.0189     | 0.0261         |
| 2,3,4,7,8-PeCDF             | 0.3                   | 0.219      | 0.291      | 0.141      | 0.165      | 0.147      | 0.21           |
| 1,2,3,4,7,8-HxCDF           | 0.1                   | 1.0        | 0.21       | 0.045      | 0.053      | 0.071      | 0.071          |
| 1,2,3,6,7,8-HxCDF           | 0.1                   | 980'0      | 0.19       | 0.043      | 0.049      | 0.066      | 0.081          |
| 2,3,4,6,7,8-HxCDF           | 0.1                   | 280'0      | 0.17       | 0.045      | 0.054      | 0.072      | 0.14           |
| 1,2,3,7,8,9-HxCDF           | 0.1                   | 0.13       | 0.23       | 290.0      | 0.102      | 0.12       | 0.11           |
| 1,2,3,4,6,7,8-HpCDF         | 0.01                  | 0.031      | 0.043      | 0.013      | 0.011      | 0.012      | 0.047          |
| 1,2,3,4,7,8,9-HpCDF         | 0.01                  | 0.029      | 0.093      | 0.02       | 0.018      | 0.018      | 0.027          |
| OCDF                        | 0.0003                | 0.00156    | 0.0036     | 0.00069    | 0.00099    | 0.00138    | 0.0033         |
| Total TEQ using DL (pg)     | DF (pg)               | 3.4E+00    | 6.0E+00    | 2.5E+00    | 2.4E+00    | 3.1E+00    | 3.4E+00        |
| Total TEQ using DL (µg)     | DL (µg)               | 3.4E-06    | 6.0E-06    | 2.5E-06    | 2.4E-06    | 3.1E-06    | 3.4E-06        |
| Total TEQ using DL (µg/cm²) | (ng/cm <sup>2</sup> ) | 3.4E-08    | 6.0E-08    | 2.5E-08    | 2.4E-08    | 3.1E-08    | 3.4E-08        |

| ۱۸ د درستار ۱۵                       |                     | BA-1       | BA-2       | <b>BA-3-BLANK</b> | 356-4      | 356-5      | ENG-558-DFP-02 |
|--------------------------------------|---------------------|------------|------------|-------------------|------------|------------|----------------|
| ALS Sample ID                        |                     | L2526958-1 | L2526958-2 | L2526958-3        | L2526958-4 | L2526958-5 | L2526958-6     |
| Target Analytes                      | TEFs                | bd         | bd         | bd                | bd         | bd         | 6d             |
| 2,3,7,8-TCDD                         | _                   | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,7,8-PeCDD                      | 1                   | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,4,7,8-HxCDD                    | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,6,7,8-HxCDD                    | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,7,8,9-HxCDD                    | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,4,6,7,8-HpCDD                  | 0.01                | 0.0797     | 0          | 0                 | 0          | 0          | 0.12           |
| 0   0   0                            | 0.0003              | 0.01068    | 0          | 0                 | 0          | 0          | 0.0204         |
| 2,3,7,8-TCDF                         | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,7,8-PeCDF                      | 0.03                | 0          | 0          | 0                 | 0          | 0          | 0              |
| 2,3,4,7,8-PeCDF                      | 0.3                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,4,7,8-HxCDF                    | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,6,7,8-HxCDF                    | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 2,3,4,6,7,8-HxCDF                    | 0.1                 | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,7,8,9-HxCDF                    | 0.1                 | 0          | 0          | 0                 | 0.102      | 0          | 0              |
| 1,2,3,4,6,7,8-HpCDF                  | 0.01                | 0          | 0          | 0                 | 0          | 0          | 0              |
| 1,2,3,4,7,8,9-HpCDF                  | 0.01                | 0          | 0          | 0                 | 0          | 0          | 0              |
| OCDF 0.                              | 0.0003              | 0          | 0.0036     | 0                 | 0          | 0          | 0.0033         |
| Total TEQ using DL =0 (pg)           | (bd) 0:             | 9.0E-02    | 3.6E-03    | 0.0E+00           | 1.0E-01    | 0.0E+00    | 1.4E-01        |
| Total TEQ using DL =0 (µg)           | (brl) 0:            | 9.0E-08    | 3.6E-09    | 0.0E+00           | 1.0E-07    | 0.0E+00    | 1.4E-07        |
| Total TEQ using DL =0 $(\mu g/cm^2)$ | g/cm <sup>2</sup> ) | 9.0E-10    | 3.6E-11    | 0.0E+00           | 1.0E-09    | 0.0E+00    | 1.4E-09        |

| Sample Name         |             | ENG-583-DFP-02 | ENG-168-DFP-01 | DFP-BLANK  | DFP-BLANK ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-01 |
|---------------------|-------------|----------------|----------------|------------|-------------------------|----------------|----------------|
| ALS Sample ID       |             | L2526958-7     | L2526958-8     | L2526958-9 | L2526958-10             | L2526958-11    | L2526958-12    |
| Target Analytes     | TEFs        | bd             | bd             | pg         | bd                      | 6d             | pg             |
| 2,3,7,8-TCDD        | 1           | <1.1           | <1.4           | <1.2       | 4.1>                    | <1.6           | <1.1           |
| 1,2,3,7,8-PeCDD     | 1           | 28.0>          | <1.2           | <0.82      | <1.3                    | 9.1>           | <1.2           |
| 1,2,3,4,7,8-HxCDD   | 1.0         | <1.5           | <1.5           | <1.0       | 4.1>                    | 2.1>           | <1.4           |
| 1,2,3,6,7,8-HxCDD   | 1.0         | <1.3           | <1.3           | <0.92      | <1.2                    | 9.1>           | <1.5           |
| 1,2,3,7,8,9-HxCDD   | 1.0         | <1.3           | <1.3           | <0.92      | <1.2                    | 8.1>           | <1.6           |
| 1,2,3,4,6,7,8-HpCDD | 0.01        | 6.9>           | 8.4>           | <2.2       | 6.6>                    | <b>7</b> 7>    | 18.1           |
| OCDD                | 0.0003      | <30            | 57.4           | <4.1       | 93.8                    | 184            | 135            |
| 2,3,7,8-TCDF        | 1.0         | <0.95          | <1.1>          | 06:0>      | <1.1>                   | 2.1>           | <0.85          |
| 1,2,3,7,8-PeCDF     | 0.03        | <0.73          | <1.3           | 62.0>      | 96.0>                   | 7'1>           | <1.1           |
| 2,3,4,7,8-PeCDF     | 6.0         | 09.0>          | 26.0>          | <0.59      | 92'0>                   | 1.1>           | <0.87          |
| 1,2,3,4,7,8-HxCDF   | 0.1         | <0.73          | 62.0>          | <0.62      | <1.0                    | 2'1>           | 96.0>          |
| 1,2,3,6,7,8-HxCDF   | 1.0         | 42.0>          | 06.0>          | 09.0>      | 1.48                    | 2.00           | <0.82          |
| 2,3,4,6,7,8-HxCDF   | 1.0         | 82.0>          | <0.83          | <0.64      | <1.0                    | 8.1>           | <0.88          |
| 1,2,3,7,8,9-HxCDF   | 0.1         | <1.3           | <1.5           | <0.96      | <1.6                    | <2.8           | <1.3           |
| 1,2,3,4,6,7,8-HpCDF | 0.01        | 3.56           | <3.7           | <1.5       | 5.17                    | 15.8           | 11.0           |
| 1,2,3,4,7,8,9-HpCDF | 0.01        | <2.1           | <6.2           | <2.3       | <5.2                    | 7'9>           | <6.5           |
| OCDF                | OCDF 0.0003 | <5.3           | 10.5           | <5.0       | 17.1                    | <21            | 14.1           |

Attachment 2-B. Dioxin/Furan TEQ Calculations

| Sample Name                  |             | ENG-583-DFP-02 | ENG-168-DFP-01 | DFP-BLANK  | ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-01 |
|------------------------------|-------------|----------------|----------------|------------|---------------|----------------|----------------|
| ALS Sample ID                |             | L2526958-7     | L2526958-8     | L2526958-9 | L2526958-10   | L2526958-11    | L2526958-12    |
| Target Analytes              | TEFs        | bd             | bd             | bd         | 6d            | pg             | bd             |
| 2,3,7,8-TCDD                 | 1           | 0.55           | 0.7            | 0.6        | 2.0           | 0.8            | 99.0           |
| 1,2,3,7,8-PeCDD              | 1           | 0.435          | 9.0            | 0.41       | 99'0          | 0.8            | 9.0            |
| 1,2,3,4,7,8-HxCDD            | 0.1         | 0.075          | 0.075          | 0.05       | 20.0          | 0.085          | 20'0           |
| 1,2,3,6,7,8-HxCDD            | 0.1         | 90.0           | 0.065          | 0.046      | 90'0          | 80.0           | 0.075          |
| 1,2,3,7,8,9-HxCDD            | 0.1         | 90.0           | 90.0           | 0.046      | 90'0          | 60'0           | 80'0           |
| 1,2,3,4,6,7,8-HpCDD          | 0.01        | 0.0345         | 0.024          | 0.011      | 0.0465        | 0.12           | 181.0          |
| ааэо                         | 0.0003      | 0.0045         | 0.01722        | 0.000615   | 0.02814       | 0.0552         | 0.0405         |
| 2,3,7,8-TCDF                 | 0.1         | 0.0475         | 0.055          | 0.045      | 950.0         | 0.075          | 0.0425         |
| 1,2,3,7,8-PeCDF              | 0.03        | 0.01095        | 0.0195         | 0.01185    | 0.0144        | 0.021          | 0.0165         |
| 2,3,4,7,8-PeCDF              | 0.3         | 60'0           | 0.1455         | 0.0885     | 0.114         | 0.165          | 0.1305         |
| 1,2,3,4,7,8-HxCDF            | 0.1         | 0.0365         | 0.0395         | 0.031      | 90.0          | 0.085          | 0.048          |
| 1,2,3,6,7,8-HxCDF            | 0.1         | 0.037          | 0.045          | 0.03       | 0.148         | 0.2            | 140.0          |
| 2,3,4,6,7,8-HxCDF            | 0.1         | 0:038          | 0.0415         | 0.032      | 20.0          | 0.09           | 0.044          |
| 1,2,3,7,8,9-HxCDF            | 0.1         | 90.0           | 0.075          | 0.048      | 80'0          | 0.14           | 90'0           |
| 1,2,3,4,6,7,8-HpCDF          | 0.01        | 9560.0         | 0.0185         | 0.0075     | 0.0517        | 0.158          | 11.0           |
| 1,2,3,4,7,8,9-HpCDF          | 0.01        | 0.0105         | 0.031          | 0.0115     | 0.026         | 0.027          | 0.0325         |
| OCDF                         | OCDF 0.0003 | 0.000795       | 0.00315        | 0.00075    | 0.00513       | 0.00315        | 0.00423        |
| Total TEQ using 1/2 DL       | DL (pg)     | 1.6E+00        | 2.0E+00        | 1.5E+00    | 2.2E+00       | 3.0E+00        | 2.1E+00        |
| Total TEQ using 1/2 DL       | _           | 1.6E-06        | 2.0E-06        | 1.5E-06    | 2.2E-06       | 3.0E-06        | 2.1E-06        |
| Total TEQ using 1/2 DL (µg/c | (µg/cm²)    | 1.6E-08        | 2.0E-08        | 1.5E-08    | 2.2E-08       | 3.0E-08        | 2.1E-08        |

| Sample Name             |          | ENG-583-DFP-02 | ENG-168-DFP-01 | DFP-BLANK  | DFP-BLANK ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-01 |
|-------------------------|----------|----------------|----------------|------------|-------------------------|----------------|----------------|
| ALS Sample ID           |          | L2526958-7     | L2526958-8     | L2526958-9 | L2526958-10             | L2526958-11    | L2526958-12    |
| Target Analytes         | TEFs     | bd             | bd             | pg         | bd                      | bd             | bd             |
| 2,3,7,8-TCDD            | 1        | 1.1            | 1.1            | 1.2        | 1.4                     | 1.6            | 1.1            |
| 1,2,3,7,8-PeCDD         | 1        | 0.87           | 1.2            | 0.82       | 1.3                     | 1.6            | 1.2            |
| 1,2,3,4,7,8-HxCDD       | 0.1      | 0.15           | 0.15           | 0.1        | 0.14                    | 0.17           | 0.14           |
| 1,2,3,6,7,8-HxCDD       | 0.1      | 0.13           | 0.13           | 0.092      | 0.12                    | 0.16           | 0.15           |
| 1,2,3,7,8,9-HxCDD       | 0.1      | 0.13           | 0.13           | 0.092      | 0.12                    | 0.18           | 0.16           |
| 1,2,3,4,6,7,8-HpCDD     | 0.01     | 690'0          | 0.048          | 0.022      | 0.093                   | 0.24           | 0.181          |
| ОСВВ                    | 0.0003   | 600'0          | 0.01722        | 0.00123    | 0.02814                 | 0.0552         | 0.0405         |
| 2,3,7,8-TCDF            | 0.1      | 0.095          | 0.11           | 60.0       | 0.11                    | 0.15           | 0.085          |
| 1,2,3,7,8-PeCDF         | 0.03     | 0.0219         | 0.039          | 0.0237     | 0.0288                  | 0.042          | 0.033          |
| 2,3,4,7,8-PeCDF         | 0.3      | 0.18           | 0.291          | 0.177      | 0.228                   | 0.33           | 0.261          |
| 1,2,3,4,7,8-HxCDF       | 0.1      | 0.073          | 0.079          | 0.062      | 1.0                     | 0.17           | 960'0          |
| 1,2,3,6,7,8-HxCDF       | 0.1      | 0.074          | 60.0           | 90.0       | 0.148                   | 0.2            | 0.082          |
| 2,3,4,6,7,8-HxCDF       | 0.1      | 0.078          | 0.083          | 0.064      | 1.0                     | 0.18           | 0.088          |
| 1,2,3,7,8,9-HxCDF       | 0.1      | 0.13           | 0.15           | 960.0      | 0.16                    | 0.28           | 0.13           |
| 1,2,3,4,6,7,8-HpCDF     | 0.01     | 0.0356         | 0.037          | 0.015      | 0.0517                  | 0.158          | 0.11           |
| 1,2,3,4,7,8,9-HpCDF     | 0.01     | 0.021          | 0.062          | 0.023      | 0.052                   | 0.054          | 0.065          |
| OCDF 0.                 | 0.0003   | 0.00159        | 0.00315        | 0.0015     | 0.00513                 | 0.0063         | 0.00423        |
| Total TEQ using DI      | DF (pg)  | 3.2E+00        | 4.0E+00        | 2.9E+00    | 4.2E+00                 | 5.6E+00        | 3.9E+00        |
| Total TEQ using DL      | DF (hg)  | 3.2E-06        | 4.0E-06        | 2.9E-06    | 4.2E-06                 | 5.6E-06        | 3.9E-06        |
| Total TEQ using DL (µg/ | (µg/cm²) | 3.2E-08        | 4.0E-08        | 2.9E-08    | 4.2E-08                 | 5.6E-08        | 3.9E-08        |
|                         |          |                |                |            |                         |                |                |

Attachment 2-B. Dioxin/Furan TEQ Calculations

| ALS Sample ID         TES         PES DES         L2526958-7         L2526958-3         L2526958-9         L2526958-10         L2526958-11         L2526 | Sample Name         |         | ENG-583-DFP-02 | ENG-168-DFP-01 | DFP-BLANK  | DFP-BLANK ENG-159-DFP-1 | ENG-583-DFP-01 | ENG-558-DFP-01 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------|----------------|----------------|------------|-------------------------|----------------|----------------|
| 7.8-β-CDD         1.6 mm         pg                                                                                                                                                                                                                                                                                        | ALS Sample ID       |         | L2526958-7     | L2526958-8     | L2526958-9 | L2526958-10             | L2526958-11    | L2526958-12    |
| 1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                            | Target Analytes     | TEFs    | bd             | bd             | bd         | pg                      | pg             | bd             |
| 1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                            | 2,3,7,8-TCDD        | 1       | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.1         0.1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>1,2,3,7,8-PeCDD</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>                                                                                                                                                                                                                                  | 1,2,3,7,8-PeCDD     | 1       | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.1         0.0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>1,2,3,4,7,8-HxCDD</td> <td>0.1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>                                                                                                                                                                                                                              | 1,2,3,4,7,8-HxCDD   | 0.1     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.1         0.0         0         0         0         0           0.01         0.01722         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                 | 1,2,3,6,7,8-HxCDD   | 0.1     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.01         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                         | 1,2,3,7,8,9-HxCDD   | 0.1     |                | 0              | 0          | 0                       | 0              | 0              |
| 0.0003         0.001722         0.00752         0.005814         0.0552           0.1         0.1         0         0         0         0         0           0.1         0         0         0         0         0         0         0           0.03         0         0         0         0         0         0         0         0           0.1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                       | 1,2,3,4,6,7,8-HpCDD | 0.01    |                | 0              | 0          | 0                       | 0              | 0.181          |
| 0.1         0.1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>aaoo</td> <td>0.0003</td> <td>0</td> <td>0.01722</td> <td>0</td> <td>0.02814</td> <td>0.0552</td> <td>0.0405</td>                                                                                                                                                                                                                  | aaoo                | 0.0003  | 0              | 0.01722        | 0          | 0.02814                 | 0.0552         | 0.0405         |
| 0.03         0.003         0.00         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td< td=""><td>2,3,7,8-TCDF</td><td>0.1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></td<>                                                                                                                                                                                                                             | 2,3,7,8-TCDF        | 0.1     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.3         0.0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>1,2,3,7,8-PeCDF</td> <td>0.03</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>                                                                                                                                                                                                                               | 1,2,3,7,8-PeCDF     | 0.03    | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.1         0.1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>2,3,4,7,8-PeCDF</td> <td>0.3</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>                                                                                                                                                                                                                                | 2,3,4,7,8-PeCDF     | 0.3     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.1         0.1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>1,2,3,4,7,8-HxCDF</td> <td>0.1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>                                                                                                                                                                                                                              | 1,2,3,4,7,8-HxCDF   | 0.1     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.1         0.0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>1,2,3,6,7,8-HxCDF</td> <td>0.1</td> <td>0</td> <td>0</td> <td>0</td> <td>0.148</td> <td>0.2</td> <td>0</td>                                                                                                                                                                                                                        | 1,2,3,6,7,8-HxCDF   | 0.1     | 0              | 0              | 0          | 0.148                   | 0.2            | 0              |
| 0.1         0.0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>2,3,4,6,7,8-HxCDF</td> <td>0.1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>                                                                                                                                                                                                                              | 2,3,4,6,7,8-HxCDF   | 0.1     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.01         0.0356         0         0         0.0517         0.158         0.158           0.01         0.01         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                   | 1,2,3,7,8,9-HxCDF   | 0.1     | 0              | 0              | 0          | 0                       | 0              | 0              |
| 0.01         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                         | 1,2,3,4,6,7,8-HpCDF | 0.01    |                | 0              | 0          | 0.0517                  | 0.158          | 0.11           |
| (003)         0.00315         0.00513         0         0.00513         0           (pg)         3.6E-02         2.0E-02         0.0E+00         2.3E-01         4.1E-01         4.1E-01           (lug)         3.6E-08         4.1E-02         0.0E+00         2.3E-07         4.1E-07           cm²         3.6E-10         8.1E-02         0.0E+00         2.3E-09         4.1E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1,2,3,4,7,8,9-HpCDF | 0.01    | 0              | 0              | 0          | 0                       | 0              | 0              |
| (pg)         3.6E-02         2.0E-02         0.0E+00         2.3E-01         4.1E-01           (ug)         3.6E-08         4.1E-02         0.0E+00         2.3E-07         4.1E-07           cm²²         3.6E-10         8.1E-02         0.0E+00         2.3E-09         4.1E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OCDF                | 0.0003  | 0              | 0.00315        | 0          | 0.00513                 | 0              | 0.00423        |
| (µg) 3.6E-08 4.1E-02 0.0E+00 2.3E-07 4.1E-07<br>:m²) 3.6E-10 8.1E-02 0.0E+00 2.3E-09 4.1E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Total TEQ using DL  |         | 3.6E-02        | 2.0E-02        | 0.0E+00    | 2.3E-01                 | 4.1E-01        | 3.4E-01        |
| m²) 3.6E-10 8.1E-02 0.0E+00 2.3E-09 4.1E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Total TEQ using DL  | =0 (µg) |                | 4.1E-02        | 0.0E+00    | 2.3E-07                 | 4.1E-07        | 3.4E-07        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Total TEQ using (   | µg/cm²) |                | 8.1E-02        | 0.0E+00    | 2.3E-09                 | 4.1E-09        | 3.4E-09        |

# **ATTACHMENT 3**

# **Data Validation**



### **Attachment 3: Data Validation**

ToxStrategies performed data validation to assess "data quality and usability" in general accordance with USEPA's National Functional Guidelines (USEPA, 2017), as well as the use of professional judgment. All of the data were considered acceptable, with the following exceptions noted in the data review comments for ALS Workorders L2526958 and L2526958. Data review comments organized by ALS Workorder are provided below.

#### ALS Workorder: 2031166

Hexavalent chromium was not detected in the laboratory method blank; the laboratory control sample / laboratory control sample duplicate (LCS/LCSD) percent recoveries and relative percent difference (RPD) were within quality control (QC) limits.

#### ALS Workorder: 2031169

Hexavalent chromium was not detected in the laboratory method blank; the LCS/LCSD percent recoveries and RPD were within OC limits.

#### ALS Workorder: 2031177

No metals were detected in the laboratory method blanks; the LCS/LCSD percent recoveries and RPDs were within QC limits.

#### ALS Workorder: 2031255

Arsenic and lead were not detected in the laboratory method blanks; the LCS/LCSD percent recoveries and RPDs were within QC limits.

#### ALS Workorder: 2031257

Arsenic and lead were not detected in the laboratory method blanks; the LCS/LCSD percent recoveries and RPDs were within QC limits.

#### ALS Workorder: 2031258

Pentachlorophenol was not detected in the laboratory method blank; the LCS/LCSD percent recoveries and RPD were within QC limits.

#### ALS Workorder: 2031261

Benzene, ethylbenzene, naphthalene, and styrene were not detected in the laboratory method blank; the LCS/LCSD percent recoveries and RPDs were within QC limits.

#### ALS Workorder: 2031263

Benzene, ethylbenzene, and naphthalene were not detected in the laboratory method blank; the LCS/LCSD percent recoveries and RPDs were within QC limits.

#### ALS Workorder: 2031264

The LCS/LCSD percent recoveries and RPD were within QC limits for respirable dust.

#### ALS Workorder: 2031269

Tetrachloroethylene was not detected in the laboratory method blank; the LCS/LCSD percent recoveries and RPD were within QC limits.

## ALS Workorder: 2031269

Organic and elemental carbon were not detected in the laboratory method blanks; the LCS/LCSD percent recoveries and RPD for organic carbon were within QC limits.

For the above-listed workorders, chemicals were not measured in the field blanks above the detection limit.

#### ALS Workorder: L2526958

The analytical method (Method 1668C) developed by USEPA (2010) provides guidance for evaluating the quality assurance/quality control results for the PCB analysis. Method 1668C indicates that "interferences and laboratory background levels"—not laboratory instruments—cause sample detections that are not otherwise observed in other chemical analyses (USEPA, 2010). As a result, the process for setting acceptable blank sample measurements is different from that for other analyses. For PCBs, the blank acceptance limit is calculated using the congener-specific minimum levels of quantitation (MLs; units of picograms [pg] per microliter [ $\mu$ L]) found in Table 2 of USEPA's Method 1668C (2010). Therefore, the congener-specific MLs represent the level at which the instrument can identify and quantify sample-specific analytes "based on the levels of contamination normally found in laboratories" (USEPA, 2010).

For each congener, the ML was calculated by multiplying the congener-specific ML (for an extract matrix in pg/ $\mu$ L) by 25  $\mu$ L (final analysis volume), by a factor of 2 (as stated in the method), and by a second factor of 2 (because the samples were split for two analyses: PCBs and dioxins/furans). For example, the extract matrix for PCB-001 is 1 pg/ $\mu$ L. Using the formula, the ML for the analysis was:

$$\begin{aligned} ML_{analysis}(pg) &= ML_{extract}(pg/\mu L) \times 25 \ (\mu L) \times 2 \times 2 \\ &= 1 \frac{pg}{\mu L} \times 25 \mu L \times 2 \times 2 \\ &= 100 \ pg \end{aligned}$$

The two field blanks (Sample IDs BA-3-BLANK and DFP-BLANK) and the two laboratory method blanks (swab and reagent matrix) were compared to their congener-specific MLs. Any detections below the ML are considered potentially to be related to laboratory contamination and not relevant to the sample itself.

All of the PCB congeners detected in the two laboratory method blanks and two field blanks were below their respective congener-specific ML, with the exception of PCB-209 measured at 270 pg in the swab blank matrix, which exceeded the congener-specific ML of 250 pg. Table 1 presents the field and method blank results for PCB-209.

Table 1. Field and method blank results for PCB-209

| Sample ID     | Sample Result (pg) | Congener-specific ML (pg) |  |  |  |
|---------------|--------------------|---------------------------|--|--|--|
|               | Field blanks       |                           |  |  |  |
| BA-3-BLANK    | 134                | 250                       |  |  |  |
| DFP-BLANK     | 59.5               | 250                       |  |  |  |
| Method blanks |                    |                           |  |  |  |
| Swab blank    | 270*               | 250                       |  |  |  |
| Reagent blank | 112                | 250                       |  |  |  |

<sup>\*</sup>The swab blank sample result for PCB-209 exceeded the congener-specific ML of 250 pg.

The extraction percent recoveries for the PCB congeners were evaluated for each sample, and all were within limits, with the exception of the extraction standard for PCB-209 in sample ENG-159-DFP-1 (0% recovery). Therefore, PCB-209 in sample ENG-159-DFP-1 was qualified as unusable.

The extraction percent recoveries of the PCB congeners for the laboratory control sample (LCS) were all within limits, with the exception of PCB-209. As indicated by the laboratory, the method blank detection of PCB-209 above the ML caused the extraction percent recovery (30%) to be below the acceptable limits (40%–145%). Professional judgment was used, and no additional data qualification was considered necessary.

A summary of the PCB-209 results for each sample and their resulting data review qualification are presented in Table 2.

Table 2. Summary of the sample results for PCB-209 and resulting data review qualification

| Sample ID      | Sample Result (pg) | Congener-specific<br>ML (pg) | Qualification based on ML |
|----------------|--------------------|------------------------------|---------------------------|
| BA-1           | 38.8               | 250                          | No qualification required |
| BA-2           | 222                | 250                          | No qualification required |
| 356-4          | 116                | 250                          | No qualification required |
| 356-5          | <130               | 250                          | No qualification required |
| ENG-558-DFP-02 | 103                | 250                          | No qualification required |
| ENG-583-DFP-02 | 141                | 250                          | No qualification required |
| ENG-168-DFP-01 | 133                | 250                          | No qualification required |
| ENG-159-DFP-1  | <5300              | 250                          | Unusable                  |
| ENG-583-DFP-01 | 89.4               | 250                          | No qualification required |
| ENG-558-DFP-01 | 218                | 250                          | No qualification required |

## **Blank Adjustments for PCB Data**

If a PCB congener was detected in a blank sample (field blank [sample IDs BA-3-BLANK, DFP-BLANK] and/or laboratory blank [swab and reagent matrix]), the maximum blank result was compared to the result for field samples. If the field sample was non-detect, no change was made. If the field sample was detected at a concentration less than two times the maximum blank sample result, the field sample result was considered a non-detect at the value reported. If the field sample was detected at a concentration more than two times the maximum blank sample, no change was made. Data that were qualified are noted in the Attachment 2-A calculations. Table 3 lists the maximum blank concentrations for each congener.

Table 3. Maximum concentration detected in a blank sample

| Congener Concentration (pg) |
|-----------------------------|
|                             |
| 2.6                         |
| 3.29                        |
| 4.51                        |
| 2.29                        |
| 5.96                        |
| 46                          |
| 3.27                        |
| 7.47                        |
| 5.22                        |
| 2.34                        |
| 1.81                        |
| 2.05                        |
| 3.01                        |
| 2.57                        |
| 5.13                        |
| 1.36                        |
| 1.26                        |
| 6.47                        |
| 1.89                        |
| 3.82                        |
| 2.93                        |
| 4.64                        |
| 4.17                        |
| 2.9                         |
| 1.57                        |
| 2.24                        |
| 1.7                         |
| 4.75                        |
| 270                         |
|                             |

#### ALS Workorder: L2526958

In general, chlorinated dioxins/furans were not detected in the two field blanks (sample IDs BA-3-BLANK and DFP-BLANK) or in the laboratory method blanks (swab and reagent matrix), with the following exceptions:

- OCDD was detected at 6.88 pg in the swab blank, slightly above the detection limit of 5.5 pg
- OCDD was detected at 4.48 pg in the reagent blank, slightly above the detection limit of 3.0 pg
- 1,2,3,6,7,8-HxCDF was detected at 0.870 pg in the swab blank, slightly above the detection limit of 0.83 pg
- 1,2,3,4,6,7,8-HpCDF was detected at 1.43 pg in the reagent blank, slightly above the detection limit of 1.1 pg
- OCDF was detected at 8.88 pg in the swab blank slightly, above the detection limit of 6.5 pg.

In general accordance with USEPA's National Functional Guidelines (USEPA, 2017), no qualification is required if there is a detection in the method blank when the sample result is non-detect. Therefore, all sample results that were non-detect were not qualified.

When the sample result exceeded the maximum detected method blank result, the sample result was not qualified, based on professional judgement. The detections found in the method blanks were not considered likely to affect the detected sample results. In most cases, the minimum detected concentration was almost twice the blank detection; only the minimum concentration of OCDF was comparable to the blank concentration. Also, chlorinated dioxins/furans were not detected in the two field blanks (Sample IDs BA-3-BLANK and DFP-BLANK), suggesting that OCDF in blanks was not interfering with field sample analysis. Thus, none of the analytes detected above the detections in the blank samples were qualified.

Only sample ID 356-5 had a detection of OCDD (6.53 pg) that was less than the maximum detected blank result (6.88 pg). For this sample, ToxStrategies qualified the result with a "U" qualifier, and the sample result was revised to <6.53 pg, in general accordance with USEPA (2017).

A summary of the resulting sample qualifications, based on the laboratory method blank detections, is presented in Table 4.

Table 4. Summary of the sample results for selected dioxin/furan congeners and resulting data review qualification

| Sample ID          | Congener            | Sample<br>Result (pg) | Maximum<br>Detected Blank<br>Result (pg) | Qualification                                                        |
|--------------------|---------------------|-----------------------|------------------------------------------|----------------------------------------------------------------------|
| BA-1               | OCDD                | 35.6                  | 6.88                                     | Professional judgment was used and no qualification was required     |
| BA-2               | OCDD                | <56                   | 6.88                                     | No qualification required                                            |
| 356-4              | OCDD                | <3.6                  | 6.88                                     | No qualification required                                            |
| 356-5              | OCDD                | 6.53                  | 6.88                                     | Sample result qualified as non-detect (U);<br>Revised value <6.53 pg |
| ENG-558-DFP-<br>02 | OCDD                | 68.0                  | 6.88                                     | Professional judgment was used and no qualification was required     |
| ENG-583-DFP-<br>02 | OCDD                | <30                   | 6.88                                     | No qualification required                                            |
| ENG-168-DFP-<br>01 | OCDD                | 57.4                  | 6.88                                     | Professional judgment was used and no qualification was required     |
| ENG-159-DFP-1      | OCDD                | 93.8                  | 6.88                                     | Professional judgment was used and no qualification was required     |
| ENG-583-DFP-<br>01 | OCDD                | 184                   | 6.88                                     | Professional judgment was used and no qualification was required     |
| ENG-558-DFP-<br>01 | OCDD                | 135                   | 6.88                                     | Professional judgment was used and no qualification was required     |
| BA-1               | 1,2,3,6,7,8-HxCDF   | < 0.86                | 0.870                                    | No qualification required                                            |
| BA-2               | 1,2,3,6,7,8-HxCDF   | <1.9                  | 0.870                                    | No qualification required                                            |
| 356-4              | 1,2,3,6,7,8-HxCDF   | < 0.49                | 0.870                                    | No qualification required                                            |
| 356-5              | 1,2,3,6,7,8-HxCDF   | < 0.66                | 0.870                                    | No qualification required                                            |
| ENG-558-DFP-<br>02 | 1,2,3,6,7,8-HxCDF   | <0.81                 | 0.870                                    | No qualification required                                            |
| ENG-583-DFP-<br>02 | 1,2,3,6,7,8-HxCDF   | <0.74                 | 0.870                                    | No qualification required                                            |
| ENG-168-DFP-<br>01 | 1,2,3,6,7,8-HxCDF   | <0.90                 | 0.870                                    | No qualification required                                            |
| ENG-159-DFP-1      | 1,2,3,6,7,8-HxCDF   | 1.48                  | 0.870                                    | Professional judgment was used and no qualification was required     |
| ENG-583-DFP-<br>01 | 1,2,3,6,7,8-HxCDF   | 2.00                  | 0.870                                    | Professional judgment was used and no qualification was required     |
| ENG-558-DFP-<br>01 | 1,2,3,6,7,8-HxCDF   | <0.82                 | 0.870                                    | No qualification required                                            |
| BA-1               | 1,2,3,4,6,7,8-HpCDF | <3.1                  | 1.43                                     | No qualification required                                            |
| BA-2               | 1,2,3,4,6,7,8-HpCDF | <4.3                  | 1.43                                     | No qualification required                                            |

| Sample ID          | Congener            | Sample<br>Result (pg) | Maximum<br>Detected Blank<br>Result (pg) | Qualification                                                    |
|--------------------|---------------------|-----------------------|------------------------------------------|------------------------------------------------------------------|
| 356-4              | 1,2,3,4,6,7,8-HpCDF | <1.1                  | 1.43                                     | No qualification required                                        |
| 356-5              | 1,2,3,4,6,7,8-HpCDF | <1.2                  | 1.43                                     | No qualification required                                        |
| ENG-558-DFP-<br>02 | 1,2,3,4,6,7,8-HpCDF | <4.7                  | 1.43                                     | No qualification required                                        |
| ENG-583-DFP-<br>02 | 1,2,3,4,6,7,8-HpCDF | 3.56                  | 1.43                                     | Professional judgment was used and no qualification was required |
| ENG-168-DFP-<br>01 | 1,2,3,4,6,7,8-HpCDF | <3.7                  | 1.43                                     | No qualification required                                        |
| ENG-159-DFP-1      | 1,2,3,4,6,7,8-HpCDF | 5.17                  | 1.43                                     | Professional judgment was used and no qualification was required |
| ENG-583-DFP-<br>01 | 1,2,3,4,6,7,8-HpCDF | 15.8                  | 1.43                                     | Professional judgment was used and no qualification was required |
| ENG-558-DFP-<br>01 | 1,2,3,4,6,7,8-HpCDF | 11.0                  | 1.43                                     | Professional judgment was used and no qualification was required |
| BA-1               | OCDF                | <5.2                  | 8.88                                     | No qualification required                                        |
| BA-2               | OCDF                | 12.0                  | 8.88                                     | Professional judgment was used and no qualification was required |
| 356-4              | OCDF                | <3.3                  | 8.88                                     | No qualification required                                        |
| 356-5              | OCDF                | <4.6                  | 8.88                                     | No qualification required                                        |
| ENG-558-DFP-<br>02 | OCDF                | 11.0                  | 8.88                                     | Professional judgment was used and no qualification was required |
| ENG-583-DFP-<br>02 | OCDF                | <5.3                  | 8.88                                     | No qualification required                                        |
| ENG-168-DFP-<br>01 | OCDF                | 10.5                  | 8.88                                     | Professional judgment was used and no qualification was required |
| ENG-159-DFP-1      | OCDF                | 17.1                  | 8.88                                     | Professional judgment was used and no qualification was required |
| ENG-583-DFP-<br>01 | OCDF                | <21                   | 8.88                                     | No qualification required                                        |
| ENG-558-DFP-<br>01 | OCDF                | 14.1                  | 8.88                                     | Professional judgment was used and no qualification was required |

The extraction percent recoveries for the dioxins/furan sample results were within limits, with the exception of the following:

- The extraction standard's percent recovery of 28% was less than the minimum control limit of 32% in sample BA-2
- The extraction standard's percent recovery of 19% was less than the minimum control limit of 26% in sample BA-2

Because the concentration data in the samples are recovery corrected based on the extraction standard result, no additional action was required.

The extraction percent recoveries of the dioxin/furan congeners for the laboratory control sample (LCS) were all within limits.

The quality control (QC) sample reports are found in Attachment D-3-1, with the exception of those for PCBs and chlorinated dioxins/furans, for which the QC report is embedded in the laboratory report (see Attachment 1).

#### References

USEPA (U.S. Environmental Protection Agency). 2010. Method 1668C, Chlorinated biphenyl congeners in water, soil, sediment, biosolids, and tissue by HRGC/HRMS. EPA-820-R-10-005, April.

USEPA (U.S. Environmental Protection Agency). 2017. National functional guidelines for organic superfund methods data review. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-002, January.

# **ATTACHMENT D-3-1**

# Quality Control (QC) Sample Reports



#### **Analysis Information**

Workorder: 2031166

Limits: Historical/Performance Preparation: NA Analysis: OSHA ID-215

Basis: ALS Laboratory Group Batch: NA Batch: ILC/26381 (HBN: 271074)

Prepared By: NA Analyzed By: Daryka Gress

#### **Blank**

LMB: 722118

Analyzed: 11/06/2020 00:00

Units: ug/sample

| Analyte             | Result | MDL | RI     |
|---------------------|--------|-----|--------|
| Analyte             | Hosuit | MDL | 112    |
| Hexavalent Chromium | ND     | NA  | 0.0600 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722119 LCSD: 722120

Analyzed: 11/06/2020 00:00 Analyzed: 11/06/2020 00:00

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

% Rec Result % Rec **QC Limits** Result **RPD QC Limits Analyte** Target Hexavalent Chromium 19.2 20.0 96.0 56.2 133.9 18.6 93.0 3.15 0.0 30.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review            |
|------------------|------------------------|
| /S/ Daryka Gress | /S/ Christopher Winter |
| 11/09/2020 10:26 | 11/09/2020 12:07       |

#### **Symbols and Definitions**

- \* Analyte above reporting limit or outside of control limits
- ▲- Sample result is greater than 4 times the spike added
- Sample and Matrix Duplicate less than 5 times the reporting limit
- Result is above the calibration range
- # The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031169

Limits: Historical/Performance Preparation: NA Analysis: OSHA ID-215

Basis: ALS Laboratory Group Batch: NA Batch: ILC/26383 (HBN: 271154)

Prepared By: NA Analyzed By: Daryka Gress

#### **Blank**

LMB: 722343

Analyzed: 11/11/2020 00:00

Units: ug/sample

| 9 1                 |        |     |        |
|---------------------|--------|-----|--------|
| Analyte             | Result | MDL | RL     |
| Hexavalent Chromium | ND     | NA  | 0.0600 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722344 LCSD: 722345

Analyzed: 11/11/2020 00:00 Analyzed: 11/11/2020 00:00

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

% Rec Result % Rec **QC Limits** Result **RPD QC Limits Analyte** Target Hexavalent Chromium 19.7 20.0 98.6 56.2 133.9 19.6 98.2 0.417 0.0 30.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review      |
|------------------|------------------|
| /S/ Daryka Gress | /S/ Thomas Bosch |
| 11/12/2020 12:10 | 11/12/2020 14:52 |

#### **Symbols and Definitions**

- \* Analyte above reporting limit or outside of control limits
- ▲- Sample result is greater than 4 times the spike added
- Sample and Matrix Duplicate less than 5 times the reporting limit
- Result is above the calibration range
- # The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/Performance Preparation: IH Metals, MCE Prep Analysis: IH Metals, MCE QC **Batch:** IIPX/28413 (HBN: 271134) **Batch:** IICP/17110 (HBN: 271312) **Basis:** ALS Laboratory Group

Prepared By: Phillip Rich Analyzed By: Joanna C. Sanchez

#### Blank

LRB: 722285 Analyzed: 11/11/2020 12:11

Units: ug/sample

| Omits: ug/sample |        |     |        |
|------------------|--------|-----|--------|
| Analyte          | Result | MDL | RL     |
| Aluminum         | ND     | NA  | 5.00   |
| Arsenic          | ND     | NA  | 2.50   |
| Barium           | ND     | NA  | 0.250  |
| Beryllium        | ND     | NA  | 0.0125 |
| Cadmium          | ND     | NA  | 0.0750 |
| Calcium          | ND     | NA  | 15.0   |
| Chromium         | ND     | NA  | 1.25   |
| Cobalt           | ND     | NA  | 0.0750 |
| Copper           | ND     | NA  | 0.500  |
| Iron             | ND     | NA  | 5.00   |
| Lead             | ND     | NA  | 0.500  |
| Lithium          | ND     | NA  | 1.00   |
| Magnesium        | ND     | NA  | 1.25   |
| Manganese        | ND     | NA  | 0.125  |
| Molybdenum       | ND     | NA  | 0.375  |
| Nickel           | ND     | NA  | 0.125  |
| Phosphorus       | ND     | NA  | 5.00   |
| Selenium         | ND     | NA  | 2.50   |
| Silver           | ND     | NA  | 0.250  |
| Sodium           | ND     | NA  | 3.75   |
| Tellurium        | ND     | NA  | 1.25   |
| Thallium         | ND     | NA  | 1.25   |
| Titanium         | ND     | NA  | 0.0750 |
| Vanadium         | ND     | NA  | 0.0750 |
| Yttrium          | ND     | NA  | 0.0750 |
| Zinc             | ND     | NA  | 0.500  |
| Zirconium        | ND     | NA  | 0.500  |
|                  |        |     |        |

LMB: 722286

Analyzed: 11/11/2020 12:12 Units: ug/sample

| ų į       |        |     |        |
|-----------|--------|-----|--------|
| Analyte   | Result | MDL | RL     |
| Aluminum  | ND     | NA  | 5.00   |
| Arsenic   | ND     | NA  | 2.50   |
| Barium    | ND     | NA  | 0.250  |
| Beryllium | ND     | NA  | 0.0125 |
| Cadmium   | ND     | NA  | 0.0750 |
| Calcium   | ND     | NA  | 15.0   |
|           |        |     |        |



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/Performance Preparation: IH Metals, MCE Prep Analysis: IH Metals, MCE QC **Batch:** IIPX/28413 (HBN: 271134) **Batch:** IICP/17110 (HBN: 271312) Basis: ALS Laboratory Group

Prepared By: Phillip Rich Analyzed By: Joanna C. Sanchez

#### Blank

LMB: 722286

**Analyzed:** 11/11/2020 12:12

Units: ug/sample

| agreample  |        |     |        |
|------------|--------|-----|--------|
| Analyte    | Result | MDL | RL     |
| Chromium   | ND     | NA  | 1.25   |
| Cobalt     | ND     | NA  | 0.0750 |
| Copper     | ND     | NA  | 0.500  |
| Iron       | ND     | NA  | 5.00   |
| Lead       | ND     | NA  | 0.500  |
| Lithium    | ND     | NA  | 1.00   |
| Magnesium  | ND     | NA  | 1.25   |
| Manganese  | ND     | NA  | 0.125  |
| Molybdenum | ND     | NA  | 0.375  |
| Nickel     | ND     | NA  | 0.125  |
| Phosphorus | ND     | NA  | 5.00   |
| Selenium   | ND     | NA  | 2.50   |
| Silver     | ND     | NA  | 0.250  |
| Sodium     | ND     | NA  | 3.75   |
| Tellurium  | ND     | NA  | 1.25   |
| Thallium   | ND     | NA  | 1.25   |
| Titanium   | ND     | NA  | 0.0750 |
| Vanadium   | ND     | NA  | 0.0750 |
| Yttrium    | ND     | NA  | 0.0750 |
| Zinc       | ND     | NA  | 0.500  |
| Zirconium  | ND     | NA  | 0.500  |
|            |        |     |        |

LRB: 722290

Analyzed: 11/11/2020 12:59

Units: ug/sample

| onits: ug/sample |        |     |        |
|------------------|--------|-----|--------|
| Analyte          | Result | MDL | RL     |
| Aluminum         | ND     | NA  | 5.00   |
| Arsenic          | ND     | NA  | 2.50   |
| Barium           | ND     | NA  | 0.250  |
| Beryllium        | ND     | NA  | 0.0125 |
| Cadmium          | ND     | NA  | 0.0750 |
| Calcium          | ND     | NA  | 15.0   |
| Chromium         | ND     | NA  | 1.25   |
| Cobalt           | ND     | NA  | 0.0750 |
| Copper           | ND     | NA  | 0.500  |
| Iron             | ND     | NA  | 5.00   |
| Lead             | ND     | NA  | 0.500  |
| Lithium          | ND     | NA  | 1.00   |



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/PerformancePreparation: IH Metals, MCE PrepAnalysis: IH Metals, MCE QCBasis: ALS Laboratory GroupBatch: IIPX/28413 (HBN: 271134)Batch: IICP/17110 (HBN: 271312)

Prepared By: Phillip Rich Analyzed By: Joanna C. Sanchez

#### Blank

LRB: 722290

Analyzed: 11/11/2020 12:59

Units: ug/sample

| omto: agroampie |        |     |        |
|-----------------|--------|-----|--------|
| Analyte         | Result | MDL | RL     |
| Magnesium       | ND     | NA  | 1.25   |
| Manganese       | ND     | NA  | 0.125  |
| Molybdenum      | ND     | NA  | 0.375  |
| Nickel          | ND     | NA  | 0.125  |
| Phosphorus      | ND     | NA  | 5.00   |
| Selenium        | ND     | NA  | 2.50   |
| Silver          | ND     | NA  | 0.250  |
| Sodium          | ND     | NA  | 3.75   |
| Tellurium       | ND     | NA  | 1.25   |
| Thallium        | ND     | NA  | 1.25   |
| Titanium        | ND     | NA  | 0.0750 |
| Vanadium        | ND     | NA  | 0.0750 |
| Yttrium         | ND     | NA  | 0.0750 |
| Zinc            | ND     | NA  | 0.500  |
| Zirconium       | ND     | NA  | 0.500  |
|                 |        |     |        |

LMB: 722291

Analyzed: 11/11/2020 13:04

Units: ug/sample

| Units: ug/sample |        |     |        |
|------------------|--------|-----|--------|
| Analyte          | Result | MDL | RL     |
| Aluminum         | ND     | NA  | 5.00   |
| Arsenic          | ND     | NA  | 2.50   |
| Barium           | ND     | NA  | 0.250  |
| Beryllium        | ND     | NA  | 0.0125 |
| Cadmium          | ND     | NA  | 0.0750 |
| Calcium          | ND     | NA  | 15.0   |
| Chromium         | ND     | NA  | 1.25   |
| Cobalt           | ND     | NA  | 0.0750 |
| Copper           | ND     | NA  | 0.500  |
| Iron             | ND     | NA  | 5.00   |
| Lead             | ND     | NA  | 0.500  |
| Lithium          | ND     | NA  | 1.00   |
| Magnesium        | ND     | NA  | 1.25   |
| Manganese        | ND     | NA  | 0.125  |
| Molybdenum       | ND     | NA  | 0.375  |
| Nickel           | ND     | NA  | 0.125  |
| Phosphorus       | ND     | NA  | 5.00   |
| Selenium         | ND     | NA  | 2.50   |



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/PerformancePreparation: IH Metals, MCE PrepAnalysis: IH Metals, MCE QCBasis: ALS Laboratory GroupBatch: IIPX/28413 (HBN: 271134)Batch: IICP/17110 (HBN: 271312)

Prepared By: Phillip Rich Analyzed By: Joanna C. Sanchez

#### Blank

LMB: 722291
Analyzed: 11/11/2020 13:04
Units: ug/sample

| Analyte   | Result | MDL | RL     |
|-----------|--------|-----|--------|
| Silver    | ND     | NA  | 0.250  |
| Sodium    | ND     | NA  | 3.75   |
| Tellurium | ND     | NA  | 1.25   |
| Thallium  | ND     | NA  | 1.25   |
| Titanium  | ND     | NA  | 0.0750 |
| Vanadium  | ND     | NA  | 0.0750 |
| Yttrium   | ND     | NA  | 0.0750 |
| Zinc      | ND     | NA  | 0.500  |
| Zirconium | ND     | NA  | 0.500  |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722287 LCSD: 722288

Analyzed: 11/11/2020 12:14 Analyzed: 11/11/2020 12:16

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Units: ug/sample |        |        |       | Units: u | g/sample |        |       |        |      |       |
|------------------|--------|--------|-------|----------|----------|--------|-------|--------|------|-------|
| Analyte          | Result | Target | % Rec | QC L     | imits    | Result | % Rec | RPD    | QC L | imits |
| Aluminum         | 95.2   | 100    | 95.2  | 86.6     | 116.0    | 95.4   | 95.4  | 0.235  | 0.0  | 15.0  |
| Arsenic          | 97.0   | 100    | 97.0  | 88.4     | 107.7    | 97.9   | 97.9  | 0.908  | 0.0  | 15.0  |
| Beryllium        | 10.4   | 10.0   | 104   | 90.4     | 116.1    | 10.4   | 104   | 0.520  | 0.0  | 15.0  |
| Calcium          | 103    | 100    | 103   | 90.2     | 126.8    | 104    | 104   | 0.532  | 0.0  | 15.0  |
| Cadmium          | 10.1   | 10.0   | 101   | 91.7     | 114.3    | 10.2   | 102   | 0.375  | 0.0  | 15.0  |
| Cobalt           | 10.7   | 10.0   | 107   | 95.8     | 117.8    | 10.7   | 107   | 0.103  | 0.0  | 15.0  |
| Chromium         | 105    | 100    | 105   | 90.9     | 117.0    | 105    | 105   | 0.0191 | 0.0  | 15.0  |
| Copper           | 10.7   | 10.0   | 107   | 94.8     | 122.2    | 10.7   | 107   | 0.0466 | 0.0  | 15.0  |
| Iron             | 105    | 100    | 105   | 92.8     | 116.4    | 105    | 105   | 0.363  | 0.0  | 15.0  |
| Lithium          | 103    | 100    | 103   | 88.7     | 115.5    | 103    | 103   | 0.399  | 0.0  | 15.0  |
| Magnesium        | 98.3   | 100    | 98.3  | 90.4     | 113.1    | 98.6   | 98.6  | 0.314  | 0.0  | 15.0  |
| Manganese        | 105    | 100    | 105   | 93.4     | 113.0    | 106    | 106   | 0.606  | 0.0  | 15.0  |
| Molybdenum       | 10.8   | 10.0   | 108   | 91.1     | 121.2    | 10.9   | 109   | 0.645  | 0.0  | 15.0  |
| Nickel           | 10.8   | 10.0   | 108   | 97.0     | 120.8    | 10.9   | 109   | 0.498  | 0.0  | 15.0  |
| Lead             | 104    | 100    | 104   | 92.4     | 116.7    | 105    | 105   | 0.527  | 0.0  | 15.0  |
| Phosphorus       | 102    | 100    | 102   | 86.7     | 118.1    | 102    | 102   | 0.0883 | 0.0  | 15.0  |
| Selenium         | 103    | 100    | 103   | 90.0     | 110.1    | 103    | 103   | 0.350  | 0.0  | 15.0  |
| Silver           | 98.7   | 100    | 98.7  | 80.0     | 118.0    | 98.9   | 98.9  | 0.201  | 0.0  | 15.0  |
| Sodium           | 110    | 100    | 110   | 92.9     | 116.4    | 111    | 111   | 0.308  | 0.0  | 15.0  |
| Tellurium        | 102    | 100    | 102   | 90.3     | 115.5    | 102    | 102   | 0.588  | 0.0  | 15.0  |
| Thallium         | 106    | 100    | 106   | 87.7     | 114.5    | 107    | 107   | 0.805  | 0.0  | 15.0  |
| Titanium         | 10.3   | 10.0   | 103   | 90.1     | 115.3    | 10.4   | 104   | 0.966  | 0.0  | 15.0  |



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/Performance Preparation: IH Metals, MCE Prep Analysis: IH Metals, MCE QC **Batch:** IIPX/28413 (HBN: 271134) **Batch:** IICP/17110 (HBN: 271312) Basis: ALS Laboratory Group

Prepared By: Phillip Rich Analyzed By: Joanna C. Sanchez

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722287 LCSD: 722288

Analyzed: 11/11/2020 12:14 Analyzed: 11/11/2020 12:16

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Analyte   | Result | Target | % Rec | QC L | imits | Result | % Rec | RPD   | QC L | imits |
|-----------|--------|--------|-------|------|-------|--------|-------|-------|------|-------|
| Vanadium  | 101    | 100    | 101   | 92.8 | 115.3 | 102    | 102   | 0.482 | 0.0  | 15.0  |
| Yttrium   | 10.3   | 10.0   | 103   | 93.9 | 113.8 | 10.4   | 104   | 0.484 | 0.0  | 15.0  |
| Zinc      | 103    | 100    | 103   | 95.2 | 117.5 | 103    | 103   | 0.223 | 0.0  | 15.0  |
| Zirconium | 101    | 100    | 101   | 88.8 | 114.2 | 102    | 102   | 1.21  | 0.0  | 15.0  |
| Barium    | 102    | 100    | 102   | 92.1 | 113.7 | 102    | 102   | 0.157 | 0.0  | 15.0  |

LCSD: 722293 LCS: 722292

Analyzed: 11/11/2020 13:06 Analyzed: 11/11/2020 13:07

Dilution: 1 Dilution: 1

| Units: ug/sample |        |        | Units: u | g/sample |       |        |       |        |      |       |
|------------------|--------|--------|----------|----------|-------|--------|-------|--------|------|-------|
| Analyte          | Result | Target | % Rec    | QC L     | imits | Result | % Rec | RPD    | QC L | imits |
| Aluminum         | 92.9   | 100    | 92.9     | 86.6     | 116.0 | 91.3   | 91.3  | 1.75   | 0.0  | 15.0  |
| Arsenic          | 95.4   | 100    | 95.4     | 88.4     | 107.7 | 93.5   | 93.5  | 2.02   | 0.0  | 15.0  |
| Beryllium        | 10.1   | 10.0   | 101      | 90.4     | 116.1 | 9.91   | 99.1  | 2.15   | 0.0  | 15.0  |
| Calcium          | 101    | 100    | 101      | 90.2     | 126.8 | 99.2   | 99.2  | 1.97   | 0.0  | 15.0  |
| Cadmium          | 9.97   | 10.0   | 99.7     | 91.7     | 114.3 | 9.80   | 98.0  | 1.77   | 0.0  | 15.0  |
| Cobalt           | 10.4   | 10.0   | 104      | 95.8     | 117.8 | 10.3   | 103   | 1.46   | 0.0  | 15.0  |
| Chromium         | 103    | 100    | 103      | 90.9     | 117.0 | 101    | 101   | 2.18   | 0.0  | 15.0  |
| Copper           | 10.5   | 10.0   | 105      | 94.8     | 122.2 | 10.2   | 102   | 2.51   | 0.0  | 15.0  |
| Iron             | 103    | 100    | 103      | 92.8     | 116.4 | 100    | 100   | 2.34   | 0.0  | 15.0  |
| Lithium          | 99.9   | 100    | 99.9     | 88.7     | 115.5 | 98.1   | 98.1  | 1.87   | 0.0  | 15.0  |
| Magnesium        | 95.7   | 100    | 95.7     | 90.4     | 113.1 | 93.8   | 93.8  | 2.01   | 0.0  | 15.0  |
| Manganese        | 103    | 100    | 103      | 93.4     | 113.0 | 101    | 101   | 2.12   | 0.0  | 15.0  |
| Molybdenum       | 10.6   | 10.0   | 106      | 91.1     | 121.2 | 10.7   | 107   | 0.516  | 0.0  | 15.0  |
| Nickel           | 10.6   | 10.0   | 106      | 97.0     | 120.8 | 10.5   | 105   | 1.72   | 0.0  | 15.0  |
| Lead             | 102    | 100    | 102      | 92.4     | 116.7 | 100    | 100   | 2.05   | 0.0  | 15.0  |
| Phosphorus       | 97.9   | 100    | 97.9     | 86.7     | 118.1 | 100    | 100   | 2.45   | 0.0  | 15.0  |
| Selenium         | 101    | 100    | 101      | 90.0     | 110.1 | 98.7   | 98.7  | 2.07   | 0.0  | 15.0  |
| Silver           | 97.5   | 100    | 97.5     | 80.0     | 118.0 | 95.0   | 95.0  | 2.61   | 0.0  | 15.0  |
| Sodium           | 106    | 100    | 106      | 92.9     | 116.4 | 104    | 104   | 1.66   | 0.0  | 15.0  |
| Tellurium        | 100    | 100    | 100      | 90.3     | 115.5 | 100    | 100   | 0.0299 | 0.0  | 15.0  |
| Thallium         | 105    | 100    | 105      | 87.7     | 114.5 | 104    | 104   | 1.66   | 0.0  | 15.0  |
| Titanium         | 10.0   | 10.0   | 100      | 90.1     | 115.3 | 10.1   | 101   | 0.417  | 0.0  | 15.0  |
| Vanadium         | 99.5   | 100    | 99.5     | 92.8     | 115.3 | 97.3   | 97.3  | 2.17   | 0.0  | 15.0  |
| Yttrium          | 10.1   | 10.0   | 101      | 93.9     | 113.8 | 9.85   | 98.5  | 2.02   | 0.0  | 15.0  |
| Zinc             | 102    | 100    | 102      | 95.2     | 117.5 | 99.3   | 99.3  | 2.76   | 0.0  | 15.0  |
| Zirconium        | 98.7   | 100    | 98.7     | 88.8     | 114.2 | 99.4   | 99.4  | 0.663  | 0.0  | 15.0  |
| Barium           | 100    | 100    | 100      | 92.1     | 113.7 | 97.6   | 97.6  | 2.51   | 0.0  | 15.0  |



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/Performance Preparation: IH Metals, MCE Prep Analysis: IH Metals, MCE QC

Basis: ALS Laboratory Group Batch: IIPX/28413 (HBN: 271134)

Batch: IICP/17110 (HBN: 271312)

Prepared By: Phillip Rich Analyzed By: Joanna C. Sanchez

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst               | Peer Review           |
|-----------------------|-----------------------|
| /S/ Joanna C. Sanchez | /S/ Kristie F. Bitner |
| 11/11/2020 16:05      | 11/12/2020 10:10      |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031177

Limits: Historical/Performance Preparation: NA Analysis: OSHA ID-215

Basis: ALS Laboratory Group Batch: NA Batch: ILC/26383 (HBN: 271154)

Prepared By: NA Analyzed By: Daryka Gress

#### **Blank**

LMB: 722343

Analyzed: 11/11/2020 00:00

Units: ug/sample

| 0 1                 |        |     |        |
|---------------------|--------|-----|--------|
| Analyte             | Result | MDL | RL     |
| Hexavalent Chromium | ND     | NA  | 0.0600 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722344 LCSD: 722345

Analyzed: 11/11/2020 00:00 Analyzed: 11/11/2020 00:00

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

% Rec Result % Rec **QC Limits** Result **RPD QC Limits Analyte** Target Hexavalent Chromium 19.7 20.0 98.6 56.2 133.9 19.6 98.2 0.417 0.0 30.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review      |
|------------------|------------------|
| /S/ Daryka Gress | /S/ Thomas Bosch |
| 11/12/2020 12:10 | 11/12/2020 14:52 |

#### **Symbols and Definitions**

- \* Analyte above reporting limit or outside of control limits
- ▲- Sample result is greater than 4 times the spike added
- Sample and Matrix Duplicate less than 5 times the reporting limit
- Result is above the calibration range
- # The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031255

Limits: Historical/Performance Preparation: IH Metals, Ghost Wipe Prep Analysis: IH Metals, Ghost Wipe QC

Basis: ALS Laboratory Group Batch: IIPX/28414 (HBN: 271142) Batch: IICP/17109 (HBN: 271304)

Prepared By: Emilee Sandoval Analyzed By: Peter P. Steen

#### Blank

□ LRB: 722313

Analyzed: 11/11/2020 10:38
Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

□ **LMB**: 722314

Analyzed: 11/11/2020 10:40
Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

□ LRB: 722318

Analyzed: 11/11/2020 11:27 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LMB: 722319

Analyzed: 11/11/2020 11:32 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722315 LCSD: 722316

Analyzed: 11/11/2020 10:42 Analyzed: 11/11/2020 10:43

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Analyte | Result | Target | % Rec | QC L | imits | Result | % Rec | RPD   | QC L | imits. |
|---------|--------|--------|-------|------|-------|--------|-------|-------|------|--------|
| Arsenic | 115    | 100    | 115   | 96.0 | 137.7 | 118    | 118   | 2.74  | 0.0  | 30.0   |
| Lead    | 92.3   | 100    | 92.3  | 78.8 | 115.4 | 92.4   | 92.4  | 0.151 | 0.0  | 30.0   |

LCS: 722320 LCSD: 722321

Analyzed: 11/11/2020 11:34 Analyzed: 11/11/2020 11:35

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Analyte | Result | Target | % Rec | QC L | imits | Result | % Rec | RPD   | QC L | imits |
|---------|--------|--------|-------|------|-------|--------|-------|-------|------|-------|
| Arsenic | 116    | 100    | 116   | 96.0 | 137.7 | 117    | 117   | 0.861 | 0.0  | 30.0  |
| Lead    | 91.3   | 100    | 91.3  | 78.8 | 115.4 | 92.1   | 92.1  | 0.883 | 0.0  | 30.0  |



#### **Analysis Information**

Workorder: 2031255

Limits: Historical/Performance Preparation: IH Metals, Ghost Wipe Prep Analysis: IH Metals, Ghost Wipe QC

Basis: ALS Laboratory Group Batch: IIPX/28414 (HBN: 271142) Batch: IICP/17109 (HBN: 271304)

Prepared By: Emilee Sandoval Analyzed By: Peter P. Steen

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst            | Peer Review      |
|--------------------|------------------|
| /S/ Peter P. Steen | /S/ Rex Bagley   |
| 12/16/2020 09:27   | 12/16/2020 11:27 |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031257

Limits: Historical/Performance Preparation: IH Metals, Ghost Wipe Prep Analysis: IH Metals, Ghost Wipe QC Basis: ALS Laboratory Group Batch: IIPX/28414 (HBN: 271142) Batch: IICP/17109 (HBN: 271304)

> Prepared By: Emilee Sandoval Analyzed By: Peter P. Steen

#### Blank

LRB: 722313

Analyzed: 11/11/2020 10:38 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LMB: 722314

Analyzed: 11/11/2020 10:40 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LRB: 722318

Analyzed: 11/11/2020 11:27 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LMB: 722319

Analyzed: 11/11/2020 11:32 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722315 LCSD: 722316

Analyzed: 11/11/2020 10:43 Analyzed: 11/11/2020 10:42

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Analyte | Result | Target | % Rec | QC Limits |       | QC Limits |      | QC Limits |     | Result | % Rec | RPD | QC L | imits |
|---------|--------|--------|-------|-----------|-------|-----------|------|-----------|-----|--------|-------|-----|------|-------|
| Arsenic | 115    | 100    | 115   | 96.0      | 137.7 | 118       | 118  | 2.74      | 0.0 | 30.0   |       |     |      |       |
| Lead    | 92.3   | 100    | 92.3  | 78.8      | 115.4 | 92.4      | 92.4 | 0.151     | 0.0 | 30.0   |       |     |      |       |

LCS: 722320 LCSD: 722321

Analyzed: 11/11/2020 11:34 Analyzed: 11/11/2020 11:35

Dilution: 1 Dilution: 1

**QC Limits** Result % Rec **RPD Analyte** Result **Target** % Rec **QC Limits** 100 116 96.0 137.7 117 117 0.861 0.0 Arsenic 116 30.0 91.3 100 91.3 78.8 115.4 92.1 92.1 0.883 0.0

Units: ug/sample

Lead

Units: ug/sample

30.0



#### **Analysis Information**

Workorder: 2031257

Limits: Historical/Performance Preparation: IH Metals, Ghost Wipe Prep Analysis: IH Metals, Ghost Wipe QC

Basis: ALS Laboratory Group Batch: IIPX/28414 (HBN: 271142) Batch: IICP/17109 (HBN: 271304)

Prepared By: Emilee Sandoval Analyzed By: Peter P. Steen

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst            | Peer Review      |
|--------------------|------------------|
| /S/ Peter P. Steen | /S/ Rex Bagley   |
| 12/16/2020 09:27   | 12/16/2020 11:27 |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031258

Limits: Historical/Performance Preparation: NA Analysis: OSHA 39

Basis: ALS Laboratory Group Batch: NA Batch: ILC/26391 (HBN: 271358)

Prepared By: NA Analyzed By: Thomas Bosch

#### **Blank**

LMB: 722880

Analyzed: 11/12/2020 00:00

Units: ug/sample

| <b>5</b> 1        |        |     |       |
|-------------------|--------|-----|-------|
| Analyte           | Result | MDL | RL    |
| Pentachlorophenol | ND     | NA  | 0.100 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722881 LCSD: 722882

Analyzed: 11/12/2020 00:00 Analyzed: 11/12/2020 00:00

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

% Rec Result % Rec **QC Limits** Result **RPD QC Limits Analyte** Target Pentachlorophenol 25.7 25.0 103 67.3 146.3 26.0 104 1.12 0.0 20.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review            |
|------------------|------------------------|
| /S/ Thomas Bosch | /S/ Christopher Winter |
| 11/13/2020 11:50 | 11/13/2020 14:04       |

#### **Symbols and Definitions**

- \* Analyte above reporting limit or outside of control limits
- ▲- Sample result is greater than 4 times the spike added
- Sample and Matrix Duplicate less than 5 times the reporting limit
- Result is above the calibration range
- # The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031261

Limits: Historical/PerformancePreparation: NAAnalysis: 3M 3500/3520 POVMBasis: ALS Laboratory GroupBatch: NABatch: IFID/12282 (HBN: 271369)

Prepared By: NA Analyzed By: Katelyn Hinman

#### Blank

MB: 722896
Analyzed: 11/11/2020 00:00
Units: mg/sample

| Analyte       | Result | MDL | RL      |
|---------------|--------|-----|---------|
| Benzene       | ND     | NA  | 0.00100 |
| Ethyl benzene | ND     | NA  | 0.0100  |
| Naphthalene   | ND     | NA  | 0.0100  |
| Styrene       | ND     | NA  | 0.0100  |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722893 LCSD: 722894

Analyzed: 11/11/2020 00:00 Analyzed: 11/11/2020 00:00

Dilution: 1 Dilution: 1

Units: mg/sample Units: mg/sample

| omor mg/sampis |        |        |       |      |       | .9.00  |       |       |      |       |
|----------------|--------|--------|-------|------|-------|--------|-------|-------|------|-------|
| Analyte        | Result | Target | % Rec | QC L | imits | Result | % Rec | RPD   | QC L | imits |
| Benzene        | 0.0198 | 0.0200 | 99.1  | 80.0 | 120.0 | 0.0199 | 99.6  | 0.589 | 0.0  | 20.0  |
| Ethyl benzene  | 0.197  | 0.200  | 98.7  | 80.0 | 120.0 | 0.199  | 99.3  | 0.561 | 0.0  | 20.0  |
| Naphthalene    | 0.203  | 0.200  | 102   | 80.0 | 120.0 | 0.207  | 104   | 1.84  | 0.0  | 20.0  |
| Styrene        | 0.200  | 0.200  | 99.8  | 80.0 | 120.0 | 0.201  | 101   | 0.759 | 0.0  | 20.0  |

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst            | Peer Review          |
|--------------------|----------------------|
| /S/ Katelyn Hinman | /S/ Steven J. Sagers |
| 11/12/2020 15:44   | 11/12/2020 17:04     |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031263

Limits: Historical/PerformancePreparation: NAAnalysis: 3M 3500/3520 POVMBasis: ALS Laboratory GroupBatch: NABatch: IFID/12284 (HBN: 271418)

Prepared By: NA Analyzed By: Katelyn Hinman

#### Blank

MB: 723015
Analyzed: 11/13/2020 00:00
Units: mg/sample

| Analyte       | Result | MDL | RL      |
|---------------|--------|-----|---------|
| Benzene       | ND     | NA  | 0.00100 |
| Ethyl benzene | ND     | NA  | 0.0100  |
| Naphthalene   | ND     | NA  | 0.0100  |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 723012 LCSD: 723013

Analyzed: 11/13/2020 00:00 Analyzed: 11/13/2020 00:00

Dilution: 1 Dilution: 1

Units: mg/sample Units: mg/sample

| • ,           |        |        |       |           |       |           |     |        |       |      |      |       |
|---------------|--------|--------|-------|-----------|-------|-----------|-----|--------|-------|------|------|-------|
| Analyte       | Result | Target | % Rec | QC Limits |       | QC Limits |     | Result | % Rec | RPD  | QC L | imits |
| Benzene       | 0.0200 | 0.0200 | 100   | 80.0      | 120.0 | 0.0200    | 100 | 0.0200 | 0.0   | 20.0 |      |       |
| Ethyl benzene | 0.200  | 0.200  | 100   | 80.0      | 120.0 | 0.200     | 100 | 0.0550 | 0.0   | 20.0 |      |       |
| Naphthalene   | 0.216  | 0.200  | 108   | 80.0      | 120.0 | 0.215     | 107 | 0.566  | 0.0   | 20.0 |      |       |

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst            | Peer Review         |
|--------------------|---------------------|
| /S/ Katelyn Hinman | /S/ Matthew Roberts |
| 11/13/2020 16:15   | 11/13/2020 16:20    |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031264

Limits: Historical/Performance Preparation: NA Analysis: NIOSH 0500/0600 Mod.

Basis: ALS Laboratory Group Batch: NA Batch: IGRV/9292 (HBN: 271348)

Prepared By: NA Analyzed By: Rex Bagley

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722840

Analyzed: 11/12/2020 12:06

Dilution: 1

Units: mg

LCSD: 722841

Analyzed: 11/12/2020 12:06

Dilution: 1

Units: mg

% Rec **QC Limits RPD QC Limits Analyte** Result Target Result % Rec Respirable Dust 15.9 15.8 101 99.0 101.0 15.9 101 0.0063 0.0 10.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review         |
|------------------|---------------------|
| /S/ Rex Bagley   | /S/ Emilee Sandoval |
| 11/12/2020 13:37 | 11/12/2020 15:24    |

#### **Symbols and Definitions**

# - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031264

Limits: Historical/Performance Preparation: IH Metals, Ghost Wipe Prep Analysis: IH Metals, Ghost Wipe QC Batch: IICP/17109 (HBN: 271304) Basis: ALS Laboratory Group Batch: IIPX/28414 (HBN: 271142)

> Prepared By: Emilee Sandoval Analyzed By: Peter P. Steen

#### Blank

LRB: 722313

Analyzed: 11/11/2020 10:38 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LMB: 722314

Analyzed: 11/11/2020 10:40 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LRB: 722318

Analyzed: 11/11/2020 11:27 Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

LMB: 722319

Analyzed: 11/11/2020 11:32 Units: ug/sample

Units: ug/sample

| Analyte | Result | MDL | RL    |
|---------|--------|-----|-------|
| Arsenic | ND     | NA  | 6.25  |
| Lead    | ND     | NA  | 0.500 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722315 LCSD: 722316

Analyzed: 11/11/2020 10:43 Analyzed: 11/11/2020 10:42

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Analyte | Result | Target | % Rec | QC L | imits | Result | % Rec | RPD   | QC L | imits. |
|---------|--------|--------|-------|------|-------|--------|-------|-------|------|--------|
| Arsenic | 115    | 100    | 115   | 96.0 | 137.7 | 118    | 118   | 2.74  | 0.0  | 30.0   |
| Lead    | 92.3   | 100    | 92.3  | 78.8 | 115.4 | 92.4   | 92.4  | 0.151 | 0.0  | 30.0   |

LCS: 722320 LCSD: 722321

Analyzed: 11/11/2020 11:34 Analyzed: 11/11/2020 11:35

Dilution: 1 Dilution: 1

**QC Limits** Result % Rec **RPD Analyte** Result **Target** % Rec **QC Limits** 

100 116 96.0 137.7 117 117 0.861 0.0 Arsenic 116 30.0 91.3 100 91.3 78.8 115.4 92.1 92.1 0.883 0.0 Lead 30.0

Units: ug/sample



#### **Analysis Information**

Workorder: 2031264

Limits: Historical/Performance Preparation: IH Metals, Ghost Wipe Prep Analysis: IH Metals, Ghost Wipe QC

Basis: ALS Laboratory Group Batch: IIPX/28414 (HBN: 271142) Batch: IICP/17109 (HBN: 271304)

Prepared By: Emilee Sandoval Analyzed By: Peter P. Steen

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst            | Peer Review      |
|--------------------|------------------|
| /S/ Peter P. Steen | /S/ Rex Bagley   |
| 12/16/2020 09:27   | 12/16/2020 11:27 |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031264

Limits: Historical/Performance Preparation: NIOSH 7500, Air Prep Analysis: NIOSH 7500 QC

**Basis:** ALS Laboratory Group **Batch:** IRA/14207 (HBN: 271390) **Batch:** IRA/14210 (HBN: 271448)

Prepared By: Rosabel Nzambi Analyzed By: Kim Clymer

#### Blank

□ **LMB**: 722926

Analyzed: 11/13/2020 00:00

Units: ug

| Analyte      | Result | MDL | RL   |
|--------------|--------|-----|------|
| Quartz       | ND     | NA  | 5.00 |
| Cristobalite | ND     | NA  | 5.00 |
| Tridymite    | ND     | NA  | 20.0 |
| Total Silica | 0.00   | NA  | NA   |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722927 LCSD: 722928

Analyzed: 11/13/2020 00:00 Analyzed: 11/13/2020 00:00

Dilution: 1
Units: ug
Dilution: 1
Units: ug

**Analyte** Result **Target** % Rec **QC Limits** Result % Rec **RPD QC Limits** Quartz 140 145 96.3 50.3 128.1 140 96.3 0.00 0.0 20.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review              |
|------------------|--------------------------|
| /S/ Kim Clymer   | /S/ Paul M. Megerdichian |
| 11/13/2020 17:44 | 11/13/2020 18:31         |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance Preparation: NA Analysis: IH GC-FID QC

Basis: ALS Laboratory Group Batch: NA Batch: IFID/12283 (HBN: 271375)

Prepared By: NA Analyzed By: Katelyn Hinman

#### Blank

MB: 722904

**Analyzed:** 11/11/2020 00:00 **Units:** mg/sample

Analyzed: 11/11/2020 00:00

Units: mg/sample

 Analyte
 Result
 MDL
 RL

 Tetrachloroethene
 ND
 NA
 0.0100

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722901 LCSD: 722902

Analyzed: 11/11/2020 00:00

Dilution: 1 Dilution: 1

Units: mg/sample

% Rec Result **Target** % Rec **QC Limits** Result **RPD QC Limits Analyte** Tetrachloroethene 0.184 0.200 91.8 80.0 120.0 0.185 92.6 0.846 0.0 20.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst            | Peer Review         |
|--------------------|---------------------|
| /S/ Katelyn Hinman | /S/ Matthew Roberts |
| 11/13/2020 10:44   | 11/13/2020 14:24    |

#### **Symbols and Definitions**

- \* Analyte above reporting limit or outside of control limits
- ▲- Sample result is greater than 4 times the spike added
- Sample and Matrix Duplicate less than 5 times the reporting limit
- Result is above the calibration range
- # The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance Preparation: NA Analysis: EPA TO-11A

Basis: ALS Laboratory Group Batch: NA Batch: ILC/26388 (HBN: 271190)

Prepared By: NA Analyzed By: Daryka Gress

#### Blank

LMB: 722422
Analyzed: 11/11/2020 04:11
Units: ug/sample

| Analyte      | Result | MDL | RL    |
|--------------|--------|-----|-------|
| Formaldehyde | ND     | NA  | 0.150 |
| Acetaldehyde | ND     | NA  | 0.150 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722423 LCSD: 722424

Analyzed: 11/11/2020 04:34 Analyzed: 11/11/2020 04:58

Dilution: 1 Dilution: 1

Units: ug/sample Units: ug/sample

| Simple agreement |        |        |       |      |       | ag, campio |       |      |           |      |
|------------------|--------|--------|-------|------|-------|------------|-------|------|-----------|------|
| Analyte          | Result | Target | % Rec | QC L | imits | Result     | % Rec | RPD  | QC Limits |      |
| Formaldehyde     | 1.54   | 1.50   | 103   | 80.0 | 120.0 | 1.52       | 101   | 1.44 | 0.0       | 20.0 |
| Acetaldehyde     | 1.50   | 1.50   | 100   | 80.0 | 120.0 | 1.53       | 102   | 1.70 | 0.0       | 20.0 |

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review      |
|------------------|------------------|
| /S/ Daryka Gress | /S/ Thomas Bosch |
| 11/11/2020 12:08 | 11/16/2020 16:52 |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

Result is above the calibration range

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reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance **Preparation: NA** Analysis: IH by GC-MS Scan **Basis:** ALS Laboratory Group Batch: NA Batch: ISPC/2310 (HBN: 271472)

**Prepared By: NA** Analyzed By: David Teynor

#### Blank

MB: 723123 Analyzed: 11/16/2020 17:50 Units: ug/sample

Analyzed: 11/16/2020 18:06

| Analyte                  | Result | MDL | RL     |
|--------------------------|--------|-----|--------|
| N,N-Dimethyl-p-toluidine | ND     | NA  | 0.0500 |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 723124 LCSD: 723125

Analyzed: 11/16/2020 18:23

| Dilution: 1              |        |        |       |          |          | Dilution: 1 |       |      |      |       |
|--------------------------|--------|--------|-------|----------|----------|-------------|-------|------|------|-------|
| Units: ug/sample         |        |        |       | Units: u | g/sample |             |       |      |      |       |
| Analyte                  | Result | Target | % Rec | QC L     | imits    | Result      | % Rec | RPD  | QC L | imits |
| N,N-Dimethyl-p-toluidine | 5.04   | 5.00   | 101   | 50.0     | 150.0    | 4.96        | 99.3  | 1.52 | 0.0  | 50.0  |

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review           |
|------------------|-----------------------|
| /S/ David Teynor | /S/ Thomas J. Masoian |
| 11/17/2020 10:09 | 11/17/2020 13:59      |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable

QC results are not adjusted for moisture correction, where applicable



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance Preparation: NA Analysis: NIOSH 5528

Basis: ALS Laboratory Group Batch: NA Batch: ISVO/5156 (HBN: 271392)

Prepared By: NA Analyzed By: David Teynor

#### Blank

LMB: 722938
Analyzed: 11/13/2020 11:00
Units: ug/sample

| Units: ug/sample       |        |     |       |
|------------------------|--------|-----|-------|
| Analyte                | Result | MDL | RL    |
| Naphthalene            | ND     | NA  | 0.500 |
| Acenaphthylene         | ND     | NA  | 0.500 |
| Acenaphthene           | ND     | NA  | 0.500 |
| Fluorene               | ND     | NA  | 0.500 |
| Phenanthrene           | ND     | NA  | 0.500 |
| Anthracene             | ND     | NA  | 0.500 |
| Fluoranthene           | ND     | NA  | 0.500 |
| Pyrene                 | ND     | NA  | 0.500 |
| Benzo(a)anthracene     | ND     | NA  | 0.500 |
| Chrysene               | ND     | NA  | 0.500 |
| Benzo(b)fluoranthene   | ND     | NA  | 0.500 |
| Benzo(k)fluoranthene   | ND     | NA  | 0.500 |
| Benzo(a)pyrene         | ND     | NA  | 0.500 |
| Indeno(1,2,3-cd)pyrene | ND     | NA  | 0.500 |
| Dibenzo(a,h)anthracene | ND     | NA  | 0.500 |
| Benzo(g,h,i)perylene   | ND     | NA  | 0.500 |
|                        |        |     |       |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722939 LCSD: 722940

Analyzed: 11/13/2020 11:25 Analyzed: 11/13/2020 11:50

Dilution: 10
Units: ug/sample
Units: ug/sample
Units: ug/sample

| PD QC<br>.61 0.                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| _                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| .62 0.                                 | 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                        | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| .04 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| .36 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 0.                                     | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 0.                                     | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 313 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| .33 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| .84 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| .07 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| '94 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 319 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| .08 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 92 0.                                  | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 220 0.                                 | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1.0).9<br>0.8<br>1.0).7<br>08<br>1.001 | 1.02 0.0 1.04 0.0 1.36 0.0 1.36 0.0 1.36 0.0 1.37 0.0 1.38 0.0 1.33 0.0 1.84 0.0 1.07 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.0 1.08 0.00 0.0 1.08 0.00 0.0 1.08 0.00 0.0 1.08 0.00 0.0 1.08 0.00 0.0 1.08 0.00 0.0 |



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance Preparation: NA Analysis: NIOSH 5528

Basis: ALS Laboratory Group Batch: NA Batch: ISVO/5156 (HBN: 271392)

Prepared By: NA Analyzed By: David Teynor

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722939 LCSD: 722940

Analyzed: 11/13/2020 11:25 Analyzed: 11/13/2020 11:50

Dilution: 10 Dilution: 10

Units: ug/sample Units: ug/sample

% Rec **QC Limits** % Rec **RPD QC Limits Analyte** Result Target Result 170.0 106 Benzo(g,h,i)perylene 21.0 20.0 105 30.0 21.1 0.722 0.0 20.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review           |
|------------------|-----------------------|
| /S/ David Teynor | /S/ Thomas J. Masoian |
| 11/17/2020 15:05 | 11/17/2020 16:20      |

#### **Symbols and Definitions**

# - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable

QC results are not adjusted for moisture correction, where applicable



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance Preparation: NA Analysis: NIOSH 5528

Basis: ALS Laboratory Group Batch: NA Batch: ISVO/5157 (HBN: 271394)

Prepared By: NA Analyzed By: David Teynor

#### Blank

LMB: 722942
Analyzed: 11/13/2020 20:47
Units: ug/sample

| Units: ug/sample       |        |     |       |
|------------------------|--------|-----|-------|
| Analyte                | Result | MDL | RL    |
| Naphthalene            | ND     | NA  | 0.500 |
| Acenaphthylene         | ND     | NA  | 0.500 |
| Acenaphthene           | ND     | NA  | 0.500 |
| Fluorene               | ND     | NA  | 0.500 |
| Phenanthrene           | ND     | NA  | 0.500 |
| Anthracene             | ND     | NA  | 0.500 |
| Fluoranthene           | ND     | NA  | 0.500 |
| Pyrene                 | ND     | NA  | 0.500 |
| Benzo(a)anthracene     | ND     | NA  | 0.500 |
| Chrysene               | ND     | NA  | 0.500 |
| Benzo(b)fluoranthene   | ND     | NA  | 0.500 |
| Benzo(k)fluoranthene   | ND     | NA  | 0.500 |
| Benzo(a)pyrene         | ND     | NA  | 0.500 |
| Indeno(1,2,3-cd)pyrene | ND     | NA  | 0.500 |
| Dibenzo(a,h)anthracene | ND     | NA  | 0.500 |
| Benzo(g,h,i)perylene   | ND     | NA  | 0.500 |
|                        |        |     |       |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722943 LCSD: 722944

Analyzed: 11/13/2020 21:11 Analyzed: 11/13/2020 21:36

Dilution: 10
Units: ug/sample
Units: ug/sample
Units: ug/sample

| Units: ug/sample       |        |        |       | Units: ug/sample |       |        |       |      |      |       |
|------------------------|--------|--------|-------|------------------|-------|--------|-------|------|------|-------|
| Analyte                | Result | Target | % Rec | QC L             | imits | Result | % Rec | RPD  | QC L | imits |
| Naphthalene            | 19.6   | 20.0   | 98.0  | 30.0             | 170.0 | 21.4   | 107   | 8.97 | 0.0  | 20.0  |
| Acenaphthylene         | 20.2   | 20.0   | 101   | 30.0             | 170.0 | 21.7   | 109   | 7.36 | 0.0  | 20.0  |
| Acenaphthene           | 19.6   | 20.0   | 97.9  | 30.0             | 170.0 | 21.1   | 105   | 7.30 | 0.0  | 20.0  |
| Fluorene               | 20.1   | 20.0   | 100   | 30.0             | 170.0 | 21.5   | 108   | 7.04 | 0.0  | 20.0  |
| Phenanthrene           | 19.5   | 20.0   | 97.3  | 30.0             | 170.0 | 20.9   | 104   | 7.03 | 0.0  | 20.0  |
| Anthracene             | 20.1   | 20.0   | 101   | 30.0             | 170.0 | 21.6   | 108   | 7.14 | 0.0  | 20.0  |
| Fluoranthene           | 20.1   | 20.0   | 101   | 30.0             | 170.0 | 21.5   | 108   | 6.70 | 0.0  | 20.0  |
| Pyrene                 | 20.1   | 20.0   | 101   | 30.0             | 170.0 | 20.5   | 103   | 1.90 | 0.0  | 20.0  |
| Benzo(a)anthracene     | 20.3   | 20.0   | 102   | 30.0             | 170.0 | 21.7   | 108   | 6.47 | 0.0  | 20.0  |
| Chrysene               | 18.9   | 20.0   | 94.7  | 30.0             | 170.0 | 20.4   | 102   | 7.62 | 0.0  | 20.0  |
| Benzo(b)fluoranthene   | 19.9   | 20.0   | 99.3  | 30.0             | 170.0 | 21.4   | 107   | 7.32 | 0.0  | 20.0  |
| Benzo(k)fluoranthene   | 19.9   | 20.0   | 99.3  | 30.0             | 170.0 | 21.1   | 106   | 6.25 | 0.0  | 20.0  |
| Benzo(a)pyrene         | 20.1   | 20.0   | 100   | 30.0             | 170.0 | 21.6   | 108   | 7.19 | 0.0  | 20.0  |
| Indeno(1,2,3-cd)pyrene | 20.2   | 20.0   | 101   | 30.0             | 170.0 | 21.6   | 108   | 6.82 | 0.0  | 20.0  |
| Dibenzo(a,h)anthracene | 20.2   | 20.0   | 101   | 30.0             | 170.0 | 21.7   | 109   | 7.12 | 0.0  | 20.0  |



#### **Analysis Information**

Workorder: 2031269

Limits: Historical/Performance Preparation: NA Analysis: NIOSH 5528

Basis: ALS Laboratory Group Batch: NA Batch: ISVO/5157 (HBN: 271394)

Prepared By: NA Analyzed By: David Teynor

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722943 LCSD: 722944

Analyzed: 11/13/2020 21:11 Analyzed: 11/13/2020 21:36

Dilution: 10 Dilution: 10

Units: ug/sample Units: ug/sample

% Rec **QC Limits** % Rec **RPD QC Limits Analyte** Result Target Result 170.0 110 Benzo(g,h,i)perylene 20.5 20.0 102 30.0 21.9 6.85 0.0 20.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst          | Peer Review           |
|------------------|-----------------------|
| /S/ David Teynor | /S/ Thomas J. Masoian |
| 11/17/2020 15:13 | 11/17/2020 16:25      |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

- Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable

QC results are not adjusted for moisture correction, where applicable



#### **Analysis Information**

Workorder: 2031281

Limits: Historical/Performance Preparation: NA Analysis: NIOSH 5040 QC

Basis: ALS Laboratory Group Batch: NA Batch: ICBN/3365 (HBN: 271284)

Prepared By: NA Analyzed By: Matthew Roberts

#### Blank

IB: 722661

Analyzed: 11/11/2020 12:19

Units: ug/cm<sup>2</sup>

| 3,000            |        |     |       |
|------------------|--------|-----|-------|
| Analyte          | Result | MDL | RL    |
| Organic Carbon   | ND     | NA  | 0.600 |
| Elemental Carbon | ND     | NA  | 0.200 |
| Total Carbon     |        |     |       |

#### **Laboratory Control Sample - Laboratory Control Sample Duplicate**

LCS: 722662 LCSD: 722663

Analyzed: 11/11/2020 12:19 Analyzed: 11/11/2020 12:19

Dilution: 1
Units: ug/cm²
Dilution: 1
Units: ug/cm²

**Analyte** Result % Rec **QC Limits** Result % Rec **RPD QC Limits Target** 121.8 Organic Carbon 24.5 26.4 92.9 79.5 27.6 105 11.9 0.0 20.0

#### QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

| Analyst             | Peer Review      |
|---------------------|------------------|
| /S/ Matthew Roberts | /S/ Max Allred   |
| 11/12/2020 08:32    | 11/13/2020 13:22 |

#### **Symbols and Definitions**

\* - Analyte above reporting limit or outside of control limits

▲- Sample result is greater than 4 times the spike added

Sample and Matrix Duplicate less than 5 times the reporting limit

Result is above the calibration range

# - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected. RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected (U - Qualifier also flags analyte as not detected)

NA - Not Applicable

QC results are not adjusted for moisture correction, where applicable

#### **APPENDIX E**

## Task 5: Cancer Risk Assessment

# Task 5: Cancer Risk Assessment

**FEBRUARY 25, 2021** 

## Tox Strategies

Innovative solutions
Sound science

# Task 5: Cancer Risk Assessment

**FEBRUARY 25, 2021** 

#### PREPARED FOR:

State of California Department of Industrial Relations 1515 Clay Street Suite 1902 Oakland, California 94612

#### PREPARED BY:

ToxStrategies, Inc. 27001 La Paz Road Suite 260 Mission Viejo, California 92691

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#### **Acronyms**

AB California Assembly Bill

CAS No. Chemical Abstracts Service Registry Number

CCR California Code of Regulations

CHSWC Commission on Health and Safety and Workers' Compensation

COPC chemical of potential concern

DIR California Department of Industrial Relations

DPM diesel particulate matter FEM fire equipment mechanic

GIABS fraction of contaminant absorbed in gastrointestinal tract

HEAST Health Effects Assessment Summary Tables IARC International Agency for Research on Cancer

IRIS Integrated Risk Information System

IUR inhalation unit risk

LAC<sub>i</sub> lifetime average concentration for chemical "i"

LADD-derm<sub>i</sub> lifetime average daily dose from dermal exposure for chemical "i" LADD-ing<sub>i.</sub> lifetime average daily dose from ingestion exposure for chemical "i"

m<sup>3</sup> cubic meter

 $\begin{array}{ll} \mu g/mg & \text{microgram per milligram} \\ mg/kg\text{-day} & \text{milligram per kilogram-day} \\ (\mu g/m^3)^{-1} & \text{per (microgram per cubic meter)} \\ \mu g/m^3 & \text{microgram per cubic meter} \\ (mg/kg\text{-day})^{-1} & \text{per (milligram per kilogram-day)} \end{array}$ 

MIG metal inert gas (welding)
MSDS Material Safety Data Sheet

NIOSH National Institute of Occupational Safety and Health OEHHA Office of Environmental Health Hazard Assessment

OEL Occupational Exposure Level

OSHA Occupational Safety and Health Administration

PAH polycyclic aromatic hydrocarbon

PBZ personal breathing zone
PCB polychlorinated biphenyls
PEL Permissible Exposure Limit
PPE personal protective equipment

RBA relative bioavailability

RELs Recommended Exposure Limits

SDS safety data sheet

SEG similar exposure group

SF slope factor

SFO slope factor for oral exposure TCDD 2,3,7,8-tetrachlorodibenzo-p-dioxin

TEF toxic equivalency factor
TEQ toxic equivalence
UCL upper confidence limit

USEPA United States Environmental Protection Agency

#### 1 Introduction

ToxStrategies was contracted by the California Department of Industrial Relations (DIR), Commission on Health and Safety and Workers' Compensation (CHSWC), to conduct the study described herein, as outlined in California Assembly Bill (AB) 1400. AB 1400 was created to define fire mechanics' risk from exposures to carcinogens in the course of their employment as fire mechanics.

The study components include:

- Site visits to representative facilities in Los Angeles County, California
- Interviews and surveys with current and former fire mechanics to assess potential exposures to carcinogens
- Feasibility study to assess the data available to calculate cancer incidence among fire mechanics
- Occupational exposure measurements of carcinogens identified as potentially present in the workplace, to evaluate potential exposure to carcinogens
- Quantitative health risk assessment of potential increased cancer risk associated with exposure to carcinogens in the workplace.

ToxStrategies' approach to address these study components includes six tasks (provided in our proposal submitted to the DIR [ToxStrategies, Inc., 2020a]):

- Task 1: Structured literature review submitted; ToxStrategies, Inc., 2020b
- Task 2: Qualitative exposure assessment submitted; ToxStrategies, Inc., 2020c
- Task 3: Epidemiologic assessment feasibility study of cohort enumeration for future epidemiologic study design on-going
- Task 4: Quantitative exposure assessment submitted; ToxStrategies, Inc. 2020d
- Task 5: Cancer risk assessment calculation of theoretical excess cancer risks from occupational exposure to carcinogens; provided herein
- Task 6: Technical assistance to the DIR.

The purpose of Task 5, Cancer Risk Assessment, was to use the quantitative results from Task 4 to calculate the theoretical excess cancer risk from exposure to carcinogenic materials for workers with similar work activities (identified as similar exposure groups [SEGs]) and primary job tasks (as determined from the qualitative assessment in Task 2), using toxicity criteria relevant to California risk assessments. A summary of the five fire mechanic SEGs and their respective job tasks are provided in Table 1 (attached).

The cancer risk assessment is an estimate of the theoretical increased risk of developing cancer as a result of exposure to chemicals present in the workplace. This approach involves varying degrees of conservatism and ensures that cancer risk is not underestimated, which makes it probable that the estimated risk will be overestimated. It is important to consider that these risks are theoretical because they are not measured directly among fire mechanics, which could only be done through use of an epidemiology study (as discussed further in Task 3). The objectives, methods, results, and conclusions of Task 5 are provided herein.

#### 1.1 Objectives

The objectives of this cancer risk assessment were as follows:

- 1. Provide a qualitative summary of work practices and quantitative exposure assumptions used to define each of the relevant SEGs and exposures related to primary job tasks.
- 2. Estimate the theoretical probability of an increased risk of cancer as a result of exposure for each SEG and job task.
- 3. Discuss qualitatively potential exposures and risks for SEGs and job tasks for which sufficient quantitative information was not available to calculate risks.
- 4. Discuss areas of uncertainty affecting the quantification of risks.

#### 1.2 Scope

This risk assessment was prepared using the guidance of California health and regulatory agencies. In cases where such guidance was not available or not applicable, other sources of information, such as the United States Environmental Protection Agency (USEPA), the Occupational Safety and Health Administration (OSHA), and the National Institute of Occupational Safety and Health (NIOSH) were used. Site-specific information was used to develop the exposure assumptions used in the risk assessment calculations.

Quantitative risk assessments consist of four parts (National Research Council, 1983):

- Hazard Identification Identify the hazardous chemicals that are present and may result in exposure.
- Exposure Assessment Develop an understanding of the applicable exposure pathways, which include the exposure media, exposure points, exposure routes, and receptors. This also includes developing quantitative estimates for various exposure assumptions and exposure-point concentrations.
- Toxicity Assessment Review regulatory references to identify quantitative criteria that relate exposure to potential health risk.
- Risk Characterization Integrate the exposure and toxicity assessments to develop quantitative estimates of potential health risks. Risk characterization

also includes discussion of qualitative evaluations where quantitative evaluations were not possible, and assessing uncertainty in the underlying assumptions.

#### 2 Hazard Identification/Data Evaluation

ToxStrategies collected personal breathing zone (PBZ) air samples and surface wipe samples on November 3 and 4, 2020, at Air Operations (Pacoima), the Breathing Apparatus Shop (Pacoima), and the Eastern Fire Shop (Los Angeles). The selection of the chemicals of potential concern (COPCs), analytical sampling methods, and quantitative results of this exposure assessment are provided in the Task 4 report (ToxStrategies, Inc., 2020d). A summary of the results is provided below.

Chemicals related to two SEGs—(1) helicopter maintenance inspector painting/priming/sanding aircraft parts at Air Operations, and (2) the field-assigned fire equipment mechanic repairing fire apparatus or other equipment at a wildfire base camp—were not measured, because these activities did not occur during the period when sampling occurred. These potential exposures have been evaluated qualitatively (Section 5.2).

Additionally, six chemicals were not measured, because, although they have been identified as potential carcinogens, regulatory toxicity criteria were not available. Diethanolamine and tetrahydrofuran are present in chemicals used for helicopter maintenance at Air Operations. Cumene, tetrabromobisphenol-A, methyl isobutyl ketone, and diethanolamine are present in chemicals used by fire equipment mechanics at the Eastern Fire Shop. These chemicals are also addressed in the qualitative assessment (Section 5.2).

For chlorinated dioxins/furans and polychlorinated biphenyls (PCBs), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalence (TEQ) values were calculated for reporting purposes. TEQs are calculated as the product of the congener-specific toxic equivalency factor (TEF) and the measured concentration for each relevant congener. Congener results in each sample that were non-detects were assigned values equal to 50% of the reporting limit for calculating the dioxin/furan/PCB TEQs. The concentrations of PCB congeners that do not have a TEF were summed for each sample (including 50% of non-detect values) for evaluation separately. The laboratory reports and calculations of the TEQ and non-TEQ totals are presented in the Task 4 quantitative exposure assessment (ToxStrategies, Inc., 2020d). Results in this section are presented only as TEQs or the sum for PCBs without TEFs.

#### 2.1 Air Sampling

PBZ air samples were collected for workers at Air Operations, the Breathing Apparatus Repair Shop, and the Eastern Fire Shop, to characterize their potential inhalation exposures during a typical shift.

On November 3, 2020, ToxStrategies collected PBZ air samples at Air Operations in Pacoima, California. The results of the air sampling at Air Operations are provided in Attachment 1.

- PBZ air samples for eight helicopter mechanics performing intermediate and/or heavy maintenance on the aircraft were analyzed for hexavalent chromium. Hexavalent chromium was detected in only one of eight samples (0.084 μg/m³) just above the detection limit (<0.081 μg/m³ [ToxStrategies, Inc., 2020d]; Attachment 1-A).
- PBZ air samples for six helicopter mechanics performing heavy maintenance on aircraft were analyzed for respirable crystalline silica, as quartz, cristobalite, and tridymite (Attachment 1-B). Crystalline silica was not detected in these samples.
- PBZ air samples for six helicopter mechanics performing intermediate maintenance on the aircraft were analyzed for benzene, ethylbenzene, and naphthalene. These chemicals were not detected in any samples (Attachment 1-C).
- Two area air samples were collected to assess general concentrations in the hangar compared to those for the specific workers: one in the hangar along the southwest wall and one in the work area (Attachment 1-C); the samples were analyzed for benzene, ethylbenzene, and naphthalene. These chemicals were not detected in either sample (Attachment 1-C).

On November 3, 2020, PBZ air samples for two equipment maintenance workers in the small engine repair shop, which is part of the Breathing Apparatus Shop, were analyzed for benzene, ethylbenzene, naphthalene, styrene, acetaldehyde, and formaldehyde. Only benzene, acetaldehyde, and formaldehyde were detected in both samples analyzed (Attachment 2-A).

On November 4, 2020, ToxStrategies collected PBZ air samples at the Eastern Fire Shop. The results of the air sampling at the Eastern Fire Shop are provided in Attachment 3.

• PBZ air samples for six fire equipment mechanics performing maintenance on the fire apparatus were analyzed for benzene, ethylbenzene, naphthalene, tetrachloroethylene, and diesel particulate matter (DPM). (Note that elemental carbon is the surrogate analyte for DPM.) Benzene, ethylbenzene, and naphthalene were not detected. Elemental carbon was detected in one sample at 180 μg/m³ but was not detected in any of the other samples at detection limits <2.5 μg/m³. It is likely that this single detection of elemental carbon does not represent diesel particulates but, rather, reflects the grinding of carbon in the steel during that day by the specific employee on which the sample was collected. For this reason, this concentration will not be evaluated in the risk assessment, because elemental carbon is not classified as a carcinogen. These results are presented in Attachment 3-A. Tetrachloroethylene was detected in all six samples, and these results are presented in Attachment 3-B.

- PBZ air samples for two fire equipment mechanics were analyzed for weldingfume metals<sup>1</sup> and hexavalent chromium during MIG (metal inert gas) welding, grinding, and cutting. Of the six metals included in the welding-fume panel, only cobalt and nickel were detected. The sample results are provided in Attachment 3-C for welding-fume metals and Attachment 3-D for hexavalent chromium.
- PBZ air samples for fire equipment mechanics performing maintenance on the fire apparatus were analyzed for N,N-dimethyl-para-toluidine, which was not detected in either sample (Attachment 3-E).
- Two area samples<sup>2</sup> at the Eastern Fire Shop were analyzed for benzene, ethylbenzene, naphthalene, and DPM, which were not detected (Attachment 3-A).

#### 2.2 Surface Sampling

Surface wipe sampling at Air Operations and the Breathing Apparatus Shop was conducted on November 3, 2020.

#### At Air Operations:

- PAHs, arsenic, and lead were analyzed in wipe samples from 12 random locations on Firehawk and Bell412 aircraft, which were parked inside the hangar for heavy maintenance and outside on the flight line. Only lead was measurable in any of these samples (Attachment 1-D-1 and 1-D-3).
- Smaller numbers of additional wipe samples were collected from various locations on Firehawk and Bell412 aircraft parked outside on the flight line. The samples were analyzed for hexavalent chromium (six samples from the aircraft engine; two samples from Mastinox-coated surfaces) and chlorinated dioxins/furans and PCBs (two samples). Hexavalent chromium, chlorinated dioxins/furans, and PCBs were detected in all samples analyzed (Attachment 1-D-2 and 1-D-4).

At the Breathing Apparatus Shop, wipe samples were collected from the air packs and fire hoses that were being repaired.

• A total of six samples were collected from field air packs and training air packs. These samples were analyzed for arsenic, lead, naphthalene, and PAHs; lead, naphthalene and PAHs were detected (Attachment 2-B-1 and 2-B-3). Two samples were analyzed for pentachlorophenol, chlorinated dioxins/furans, and

The welding-fume metals that are carcinogens include arsenic, beryllium, cadmium, cobalt, lead, and nickel.

One area sample was collected in the center third aisle column (from the south entrance), and one sample was collected in the third bay along the west side (on the work bench).

PCBs (Attachments 2-B-1 and 2-B-2). Chlorinated dioxins/furans and PCBs were detected in both samples. Lead, chlorinated dioxins/furans, and PCBs were detected in both the training and field air packs; PAHs were detected in the training air packs only. Arsenic and pentachlorophenol were not detected in any of the wipe samples collected on the air packs.

• Wipe samples were also collected on the exterior locations of used fire hoses at six locations. PAHs, arsenic, and lead were analyzed in wipe samples, but only lead was detected (in all six samples). The results are presented in Attachment 2-C-1 and 2-C-2.

Surface wipe sampling at the Eastern Fire Shop was conducted on November 4, 2020. PAHs, chlorinated dioxins/furans, PCBs, pentachlorophenol, lead, and arsenic were analyzed in wipe samples from various locations on the fire truck. Only lead, chlorinated dioxins/furans, and PCBs were detected. The results are presented in Attachment 3-F-1, 3-F-2, and 3-F-3.

#### 2.3 Chemicals of Potential Concern

For fire mechanics, COPCs are those carcinogenic chemicals that are associated with exposure related to the work activities. COPCs for this project were identified by location/SEG combination and by each medium (air or surfaces). Chemicals detected in at least one sample were identified as COPCs for a specific location and medium. Chemicals that were analyzed but not detected in any samples were evaluated in the uncertainty assessment.

#### 2.3.1 Air Operations

Hexavalent chromium was detected in one or more samples and is considered a COPC in air at this location for this risk assessment. Hexavalent chromium, lead, PCBs, and dioxin/furans were detected and are considered COPCs on various equipment surfaces for this location. In addition, hexavalent chromium was detected on Mastinox-coated surfaces on the aircraft.

#### 2.3.2 Breathing Apparatus Shop

Benzene, acetaldehyde, and formaldehyde were detected in one or more samples and are considered COPCs in air at the small engine repair shop. Lead, PAHs, PCBs, and dioxins/furans were detected and are considered COPCs on air-pack surfaces for this location/SEG. Only lead was detected on fire hoses, which will be evaluated as a COPC for this location/SEG.

#### 2.3.3 Eastern Fire Shop

Tetrachloroethylene was detected in one or more air samples and is considered a COPC in air for this location. In addition, PBZ air samples were collected to characterize inhalation exposure for a welder. Cobalt and nickel were detected in one or more air samples and are considered COPCs in air for this location/SEG. Lead, PCBs, and dioxins/furans were detected on surfaces and are considered COPCs on surfaces for this location.

#### 3 Exposure Assessment

Exposure assessment is the process by which the sources of chemicals, their transport mechanisms, relevant exposure routes, and receptors are identified. The receptors in this analysis are the workers in each of the SEGs. The sources of chemicals are the products used or the equipment with which the workers have contact or otherwise interact when conducting maintenance tasks. The chemicals may be released to air and onto surfaces related to worker activities. Exposure routes for helicopter mechanics, equipment maintenance workers, and fire equipment mechanics are inhalation, dermal absorption, and incidental ingestion.

#### 3.1 Similar Exposure Groups

Each of the primary SEGs identified in the qualitative exposure assessment report (Task 2; ToxStrategies, Inc., 2020c) applicable to this exposure assessment is described in general in this section.

#### 3.1.1 Helicopter Mechanic / Helicopter Maintenance Inspector

Heavy maintenance of the aircraft typically takes place inside the hangar, and the mechanics generally wear a uniform, work boots, goggles/safety glasses, hearing protection, gloves (type dependent on task), and knee pads.

Intermediate maintenance on the aircraft takes place on a daily basis and can take approximately an hour to complete. This job is usually conducted outdoors on the flight line, and personal protective equipment (PPE) includes work boots, work uniform, goggles/safety glasses, hearing protection, gloves (dependent on task), and knee pads.

Painting, priming, and sanding of aircraft components can take place in the paint booth, inside the hangar, or outside in the open air, depending on the aircraft component. The mechanic may use a variety of different paints, paint strippers, primers, and enamels. Depending on the paint job, it could take 30 minutes or less and be performed once per week, or it could take 10 hours a week and be performed for 40 hours a month. For the major paint jobs, the Helicopter Maintenance Inspector is the primary painter. His work typically takes place in the paint booth, with installed exhaust filters, using an airline respirator.

#### 3.1.2 Equipment Maintenance Worker

At the small engine repair shop, worker tasks include equipment examination and analysis of equipment malfunctions or mechanical failure. Other tasks include tuning up equipment used by the County fire stations, such as rescue tools, lawn mowers, vacuums, and generators.

At the fire hose repair shop, the workers are responsible for repairing fire-truck hoses and completing the hose test. Equipment, such as firefighter air packs, is maintained and tested at the Breathing Apparatus Shop (Pacoima). Air packs used during fire training in

simulated structure burns, such as that conducted at the Los Angeles County Fire Department Fire Station 129 in Lancaster, are maintained at the Breathing Apparatus Shop. The workers' PPE includes latex gloves and an apron.

#### 3.1.3 Fire Equipment Mechanic

The shop-assigned fire equipment mechanics (FEMs) at either the Eastern Fire Shop or the North County Fire Shop conduct daily maintenance of the fire apparatus, which is a highly variable job task and encompasses a wide range of products and tools. Shop-assigned FEMs typically work on the major repairs such as engine and transmission changes, inframe engine rebuilds, differential exchanges and rebuilds, major pump repair, plumbing issues, and water tank removal, and they are required to do a significant amount of welding to repair or replace some parts. Both shop locations have facilities with roll-up doors and a diesel exhaust capture system that can be used when the apparatus is running inside the building, but those systems do not operate when the vehicles are moving in and out of the shop. The Eastern Fire Shop also has side-wall vents that exhaust air out of the building. FEMs may use a combination of a face shield, gloves (rubber or latex/nitrile), N95 respirator, and work boots when performing their job task. The daily maintenance of the fire apparatus occurs during the entire workday, every day.

Depending on the number of wildfires that occur each year, the field-assigned FEMs may get called to a wildfire base camp<sup>3</sup> for approximately 2-week durations, 24 hours per day. During this time, the assigned FEMs are required to stay onsite for the assigned period and are responsible for repairing any fire apparatus or fire equipment that is needed. Further, field-assigned FEMs may also get called to a fire site. Although this occurs infrequently (approximately once every three years), the field-assigned FEM is responsible for needed fire apparatus repairs anywhere, at any time. Therefore, there are no exposure bounds for this group of workers, and the level of PPE provided (work boots, work uniform, gloves, eye protection, N95 respirator) is less than that provided to the firefighters.

#### 3.2 Exposure Points and Exposure Pathways

The following primary SEGs and locations were evaluated to quantify exposure:

- Intermediate and heavy maintenance on aircraft at Air Operations
- Repair and tune-up of power equipment at the small engine repair shop (Breathing Apparatus Shop)
- Maintenance/repair on fire apparatus at the Eastern Fire Shop.

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The outdoor base camps are a mobilization and staging area for firefighters and support personnel during a large wildfire.

For each of these SEGs, there are three relevant exposure pathways:

- Inhalation of air in the workplace, which is based on measurements from PBZ air samplers
- Dermal contact with residues on surfaces, which is based on measurements from relevant surfaces
- Incidental ingestion of residues on surfaces, which is based on measurements from relevant surfaces.

In addition, exposures were evaluated for SEGs that addressed specific activities that were not addressed by the SEGs described above. Typically, these additional exposures were different, because exposure rates were lower than for the primary SEGs, based on lower exposure frequencies or lower surface concentrations. The following activities/SEGs were evaluated separately.

- Contact with Mastinox during intermediate and heavy maintenance on aircraft at Air Operations, resulting in dermal contact and incidental ingestion exposures
- Fire hose repair at the fire hose repair shop (Breathing Apparatus Shop), resulting in dermal contact and incidental-ingestion exposures (air samples were not collected)
- Air pack repair at the Breathing Apparatus Shop, resulting in dermal contact and incidental-ingestion exposures (air samples were not collected)
- Welding/grinding/cutting activities during maintenance and repair on fire apparatus at the Eastern Fire Shop, resulting in inhalation exposures (air samples were collected for welding workers during the work day).

#### 3.3 Exposure Quantification

Exposure was quantified for each of the exposure pathways based on assumptions relevant to the SEGs. Because the cancer potency values are developed for continuous exposure over the course of a lifetime, it is appropriate to calculate the fraction of a lifetime that mechanics are exposed for each SEG. Table 2 summarizes exposure assumptions for each exposure pathway discussed further in this section.

#### 3.3.1 Inhalation Exposure

Inhalation exposure was calculated using the following equation:

$$Inhalation \ Exposure = \frac{Ca}{PF} \times ET_f \times EF \times ED$$

Assumptions for each parameter are described below.

Inhalation Exposure (micrograms per cubic meter ( $\mu g/m^3$ ): Average air concentration based on frequency and duration of exposure.

Concentration in air (Ca;  $\mu$ g/m³): Concentration in air was measured for each SEG. These are discussed further in Section 2.1, above.

**Protection Factor (PF; unitless):** A protection factor is used to adjust inhalation exposure when a respirator is used to protect the employee from exposure. An N95 half-mask respirator is used for welding activities, and thus, a protection factor of 10 was used for this exposure (CCR, Title 8, §5144. Respiratory Protection). All other SEGs were evaluated assuming that no respirator was used (a protection factor of 1).

**Exposure Time Ratio (ET\_f; hours/hours):** This is the time that a worker spends per day exposed to chemicals in air. The exposure time ratio for SEGs at Air Operations and the Eastern Fire Shop is 9 hours per 24-hour day, based on the standard work week at these locations, resulting in an exposure time ratio of approximately 0.38. The exposure time ratio for SEGs at the Breathing Apparatus Repair Shop was 8 hours per 24-hour day based on the standard work week, resulting in an exposure time ratio of approximately 0.33.

**Daily Exposure Frequency Ratio (EF; days/days):** Exposure frequency is the number of days averaged over one year that a worker is exposed. For air exposures, exposure frequency is considered to be the number of days exposed out of a 365-day year. Three SEGs had different exposure frequencies based on site-specific information provided to ToxStrategies:

- Exposure frequency for Air Operations (EF\_1) was based on working 9 days over 2 weeks (9 days/2 weeks \* 50 weeks, or 225 days per year). The 50 weeks total excludes 2 weeks of vacation. Air Operations SEGs also put in up to 500 hours of overtime, which is approximately an additional 55 nine-hour days, for a total of 280 days per year, resulting in an exposure frequency ratio of 0.77.
- Exposure frequency for the Breathing Apparatus Shop (EF\_2) was based on working 5 days per week for one year (5 days/week \* 50 weeks, or 250 days). Breathing Apparatus Shop SEGs also put in up to 100 hours of overtime, which is approximately twelve 8-hour days, for a total of 262 days per year, resulting in an exposure frequency ratio of 0.72.
- Exposure frequency for the Eastern Fire Shop (EF\_3) was based on working 9 days per 2 weeks (9 days/2 weeks \* 50 weeks, or 225 days). Eastern Fire Shop SEGs also put in up to 200 hours of overtime, which is approximately twenty-two 9-hour days, for a total of 247 days per year, resulting in an exposure frequency ratio of 0.68.

**Exposure Duration Ratio (ED; years/years):** Workers are assumed to work for 45 years out of a 70-year lifetime (0.64) (NIOSH, 2017). This may be an overestimation for the working tenure of most mechanics evaluated as part of our survey of Los Angeles County because the County hires trained mechanics, e.g., in Air Operations, all mechanics had at least 10 years of experience before qualifying to work for the county Fire Department.

#### 3.3.2 Dermal Contact

Dermal contact occurs when mechanics contact surfaces covered with residues containing chemicals of interest. Site-specific assumptions (Table 2) and chemical-specific dermal absorption factors selected from the scientific literature (Table 3) were used to evaluate potential dermal absorption through the skin. Potential dermal contact was calculated as:

$$Dermal\ Contact\ Exposure = \left(\frac{Csw \times CF \times SAf \times Abs \times EV \times EF \times ED\_y}{ATca \times BW}\right)$$

Dermal Contact Exposure (milligram per kilogram per day [mg/kg-day]): Amount of daily chemical exposure per kilogram body weight.

Concentration on surface wipe (Csw; micrograms per square centimeter  $[\mu g/cm^2 - event]$ ): Potential concentrations on the surface of the skin were estimated using surface wipe sample results. The results are discussed in Section 2.2, above.

Conversion Factor (CF; milligrams per micrograms [mg/ $\mu$ g]): Concentrations on the surface wipes were converted from  $\mu$ g to mg using a factor of 0.001.

Surface area of fingers (SAf; square centimeters [cm²]): All SEGs wear gloves while working. However, there are tasks for which gloves may not worn, and gloves also can tear. To estimate the surface area for the portion of the hand subject to dermal exposure, we used 19 cm², based on assumptions provided by the Office of Environmental Health Hazard Assessment (OEHHA) in their interpretive guidelines for safe use determinations concerning lead fishing weights (OEHHA, 2008). The area is equal to the surface area of the first three fingers of the palmar surface for both male adult hands.

**Percent absorption (Abs; %):** Percent absorption is a chemical-specific property. Details from the literature review used to develop these values is presented in Attachment 4. Table 3 summarizes these chemical-specific factors.

Event frequency (EV; events per day): To be conservative in this assessment, we have assumed that dermal contact occurs once per hour. Based on observations during visits to the facilities, torn gloves or activities that are performed without gloves that allow for direct contact with surfaces may not occur as often as once per hour. At the rate of one contact per hour, SEGs at Air Operations and the Eastern Fire Shop who work 9 hours per day would have 9 contacts per day. SEGs at the Breathing Apparatus Shop who work 8 hours per day would have 8 contacts per day. SEGs who contact Mastinox at Air Operations would have one contact per day, based on information provided to ToxStrategies.

**Exposure Frequency (EF; days per year):** Consistent with the discussion of inhalation exposures, exposure frequency is a combination of typical work schedules and overtime hours. As described for inhalation exposure (Section 3.3.1), the exposure frequencies are as follows:

• Air Operations — 280 days per year

- Breathing Apparatus Shop 262 days per year
- Eastern Fire Shop 247 days per year.

Additionally, SEG-specific exposure parameters were developed for the purpose of assessing dermal exposure to Mastinox on aircraft parts at Air Operations. Based on information provided to ToxStrategies, exposure frequency for contacting Mastinox is estimated to be 14 days per month for 12 months, resulting in 168 days per year.

**Exposure Duration (ED; years):** Workers are assumed to work for 45 years (NIOSH, 2017).

**Body weight (BW: kilograms [kg]):** Body weight for an adult worker is assumed to be 80 kg (DTSC, 2019).

**Averaging Time for carcinogens (ATca; days):** The averaging time for carcinogenic risk assessments is 70 years, or 25,550 days (70 years \* 365 days) (DTSC, 2019).

#### 3.3.3 Incidental Ingestion Exposure

Incidental ingestion occurs when fire mechanics contact surfaces with residues on the surface that contain chemicals of interest and then touch their hands to their mouths. Those chemicals from the residues can adhere to their hands, and subsequently, the particles can be ingested. Site-specific and general assumptions were used to evaluate potential incidental ingestion (Table 2). Chemical-specific relative bioavailability (RBA) via ingestion exposure was also included (Table 3). Incidental ingestion in this scenario is based on the same residue levels estimated for dermal absorption. A portion of the chemical (up to 25% depending on the chemical; Table 3) is potentially absorbed through the skin based on the chemical-specific dermal absorption factors. The remaining 75% is available for incidental ingestion, which is greater than the approximately 50% that is estimated to transfer from the fingers to the mouth. Therefore, the residue on the fingertips is sufficient for both the dermal and incidental ingestion pathways.

Potential incidental ingestion was calculated as follows:

$$Incidental\ Ingestion\ Exposure \\ = \left(\frac{Csw \times CF \times SAf \times Fdirect \times RBA \times \gamma - d \times ET_{hours} \times EF \times ED\_y}{ATca \times BW}\right)$$

**Incidental Ingestion Exposure (mg/kg-day):** Daily exposure amount per kilogram body weight.

Concentration on surface wipe (Csw; micrograms per square centimeter [µg/cm²]): Potential concentration on the surface of the skin was measured using surface wipe sampling. The results are discussed in Section 2.2.

Conversion Factor (CF; milligrams per micrograms [mg/ $\mu$ g]): Concentrations on the surface wipes were converted from  $\mu$ g to mg using a factor of 0.001.

Surface area of fingers (SAf; square centimeters [cm<sup>2</sup>]): Consistent with the assumptions for dermal exposure, all SEGs wear gloves while working. However, there are tasks for which gloves may not be worn, and gloves can tear. To estimate the surface area for the portion of the hand subject to dermal exposure and subsequent ingestion, we used 19 cm<sup>2</sup>, based on assumptions provided by OEHHA in their interpretive guidelines for safe use determinations for lead fishing weights (OEHHA, 2008). The area is equal to the surface area of the first three fingers of the palmar surface for both male adult hands.

**Direct Transfer Factor (Fdirect):** OEHHA's interpretive guideline estimates that 50% (0.5) of the chemical on the relevant part of the hand is transferred from the hands to the mouth (OEHHA, 2008).

**Relative bioavailability (RBA):** Relative bioavailability is a chemical-specific property that relates the amount of a chemical that is systemically available after ingestion to the amount of chemical that was systemically available in the oral toxicity testing. USEPA has developed default RBAs for arsenic and lead in soil (USEPA, 2021a,b) that have been applied herein. The RBA for all other chemicals was assumed to be 100%.

Number of Contacts per Hour ( $\gamma$ -d): Consistent with the assumptions for dermal exposure, we have assumed that dermal contact occurs once per hour, which assumes that gloves aren't worn or are torn once per hour. This is conservative, based on observations during visits to the facilities: torn gloves or activities that are performed without gloves may not occur as often as once per hour.

**Exposure Time (ET; hours per day):** SEGs at Air Operations and the Eastern Fire Shop work 9 hours per day, and at one contact per hour, would have nine contacts per day. SEGs at the Breathing Apparatus Shop work 8 hours per day, and at one contact per hour, would result in eight contacts per day. SEGs that contact Mastinox at Air Operations would have one contact per day, based on the information provided to ToxStrategies.

**Exposure Frequency (EF; days per year):** Consistent with the discussion for dermal contact exposures, exposure frequency is a combination of typical work schedules and overtime hours. As described for dermal contact exposure (Section 3.3.2), the exposure frequencies are as follows:

- Air Operations 280 days per year
- Breathing Apparatus Shop 262 days per year
- Eastern Fire Shop 247 days per year.

Additionally, for the purpose of assessing dermal exposure, surface samples were collected from Mastinox on aircraft parts at Air Operations. Based on information provided to Tox-Strategies, exposure frequency for contacting Mastinox is estimated to be 168 days per year.

**Exposure Duration (ED; years):** Workers are assumed to work for 45 years (NIOSH, 2017).

**Body weight (BW: kilograms [kg]):** Body weight for an adult worker is assumed to be 80 kg (DTSC, 2019).

**Averaging Time for carcinogens (ATca; days):** The averaging time for carcinogenic risk assessments is 70 years or 25,550 days (70 years \* 365 days) (DTSC, 2019).

#### 3.4 Exposure-Point Concentrations

Exposure-point concentrations for each medium (air and surfaces) were developed for each SEG/location. Chemicals that were detected in at least one sample of air or one surface wipe were considered COPC for the purpose of this risk assessment. Chemicals that were never detected were evaluated separately for the uncertainty assessment, to understand whether the detection limits were sufficiently low for eliminating the need to further evaluate risk (Section 5.1.3)

Exposure point concentrations were calculated as follows:

- If a chemical was detected in at least one sample and analyzed in at least five samples, the exposure-point concentration was the average of all the sample results. One-half the detection limit was used to substitute for non-detect values when calculating the average (AIHA, 2015).
- If a chemical was detected in at least one sample and analyzed in fewer than five samples of a specific medium, the maximum detected concentration was used as the exposure-point concentration in the absence of sufficient data to calculate a representative average.

A summary of the exposure-point concentrations is presented in Table 4 for personal breathing-zone samples and in Table 5 for surface wipe samples.

#### 4 Toxicity Assessment

This toxicity assessment provides the quantitative measures, termed cancer potency or unit risks, used to estimate the increased risk of developing cancer based on the cumulative exposure to carcinogens estimated over the working lifetime of fire mechanics, as quantified in Section 3. The DIR requested that cancer potency and unit risk estimates be developed using guidance from California agencies as the first preference For some of the COPCs, cancer potency criteria were readily available for potential carcinogenic health effects. For others, a review of regulatory references did not provide information that was appropriate for use in a quantitative estimate of potential cancer risks.

#### 4.1 Chemicals with Available Cancer Potency Criteria

Toxicological values and information regarding the potential for carcinogenic effects in humans were obtained from a hierarchy of regulatory references, beginning with California's regulations for toxicity criteria for human health risk assessment (California Code of Regulations, Title 22, Sections 68400.5, 69020-69022), followed by other California guidance and USEPA references. These references provide chemical-specific toxicity data that represent consensus within the regulatory agency. In cases for which insufficient data were available from California sources, guidance from the federal EPA, OSHA and NIOSH were used.

The complete hierarchy of sources reviewed is as follows:

- 1. California's Toxicity Criteria for Human Health Risk Assessment (California Code of Regulations [CCR], Title 22, Sections 68400.5, 69020-69022)
- 2. OEHHA, 2011a, Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures.
- 3. OEHHA, Public Health Goals (e.g., 2011b)
- 4. OEHHA, Expedited Cancer Potency Factor (1992)
- 5. USEPA's IRIS database (USEPA, 2020b)
- 6. USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs) (e.g., USEPA, 2008)
- 7. Other toxicity values includes additional USEPA and non-USEPA sources of toxicity information. Non-USEPA sources include the ATSDR (https://www.atsdr.cdc.gov). USEPA sources include the most current Health Effects Assessment Summary Tables (HEAST; USEPA, 1997).

In risk assessment, quantitative values are used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular level of a potential carcinogen. Specifically, for inhalation exposures, an inhalation unit risk value (IUR) is developed similarly and represents the risk associated with exposure to  $1 \mu g/m^3$  of a chemical in air; IURs are expressed in units of  $(\mu g/m^3)^{-1}$ . For non-inhalation pathways, a slope factor (SF) is a plausible upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime, which is the 95% upper confidence limit (UCL) of the slope of the dose-response curve expressed in units of the inverse of milligrams per kilogram-day  $(mg/kg-day)^{-1}$ . Tables 6 and 7 present the cancer toxicity criteria for inhalation and oral/dermal exposures, respectively.

#### 4.2 Adjustment to Oral Slope Factors for Dermal Exposure

For dermal exposure, the exposure assessment results in an estimate of absorbed dose. However, oral toxicity criteria, which are typically used to assess risk from dermal exposure, are typically based on administered dose. The difference between administered and

absorbed dose in the development of oral toxicity criteria can result in an underestimation of potential health risks from dermal exposure (USEPA, 2004). Oral toxicity criteria based on an administered dose may therefore need to be adjusted to account for the difference between the administered dose in the critical study (which formed the basis of the toxicity criterion) and the absorption efficiency of the chemical in question. The oral toxicity criteria can be adjusted and applied appropriately to dermal exposures. Table 3 presents the oral-to-dermal adjustment factor (fraction of contaminant absorbed in gastrointestinal tract; GIABS) for the COPCs.

#### 5 Risk Characterization

In this section of the risk assessment, toxicity and exposure assessments are integrated into quantitative expressions of theoretical increased carcinogenic risks. Increased cancer risk estimates are quantified for SEGs based on the estimated exposures to measured carcinogens. An uncertainty analysis is included to address areas of the risk estimates that may over- or underestimate risks. Qualitative discussions of SEGs that could not be evaluated are also included.

#### 5.1 Quantitative Estimate of Theoretical Increased Cancer Risks

The estimates of increased risk for individual COPCs and exposure pathways are presented in spreadsheets contained in Attachment 5. Risks are characterized by location and SEG (e.g., Eastern Fire Shop, welding). For quantitative estimates of potential increased cancer risk, the calculated risk associated with exposure to surface dust and air are summed to estimate cumulative risk. Theoretical excess cancer risks were calculated for each carcinogen where detectable concentrations of a chemical were measured and quantitative cancer potency values were available. Cases where one or the other of these factors were unavailable are discussed in Section 5.2. Consistent with regulatory policy, our risk assessment assumes no threshold for carcinogenicity, meaning there is no exposure level at which there is no increased risk of cancer. These risks are not measurable and therefore only theoretical model-based estimates. As such, the calculated increased risks estimates developed herein are compared with risk ranges that have been considered acceptable by regulatory agencies charged with risk management.

Typically, excess cancer risk for occupational exposures is determined to be significant if the risk for a working population exceeds 1 in 1,000. This threshold for significance has been used by OSHA for nearly 20 years following the Supreme Court decision in *American Petroleum Institute v. Industrial Union Department* [448 U.S. 607 (1980)] (commonly referred to as the Benzene decision), wherein the court concluded that a reasonable person might regard a lifetime cancer risk of 1 in 1,000 as significant, yet might regard a risk of 1 in 1,000,000,000 as trivial. As such, current regulatory occupational exposure limits (OELs) for carcinogenic substances such as the OSHA PELs were developed with the 1 in 1000 threshold. Recent NIOSH Recommended Exposure Limits (RELs), including that hexavalent chromium (NIOSH, 2013) and titanium dioxide (NIOSH, 2011) have been based on an excess cancer risk rate of 1 in 1,000 but also considered technical feasibility.

While the Supreme Court decision established that cancer risk greater than 1 in 1,000 is significant, it did not conclude that risks between 1 in 1,000 and 1 in 1,000,000,000 are insignificant. Risk managers often judge "acceptable risks" to be those in the range of 1 in 10,000 to 1 in 1,000,000. Recently, NIOSH updated its Chemical Carcinogen Policy and will establish Risk Management Limits for Carcinogens at air concentrations that correspond to the 95<sup>th</sup> percentile lower confidence limit of the 1 in 10,000 risk estimate (NIOSH, 2017). Similarly, DIR indicated that their goal is 1 in 10,000 (personal communication, Eric Berg, January 26, 2021). Therefore, for the purpose of this risk assessment, excess cancer risks calculated to be less than 1 in 10,000 have been judged *de minimus*.

#### 5.1.1 Quantifying Increased Cancer Risk

The calculated increase cancer risks are estimated as the additional probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. For example, the same potential risk could be described as one additional case out of ten thousand people exposed under the assumptions evaluated, e.g., 1 of 10,000 workers with SEG exposures for 45 years. For consistency with the target level discussed above, cancer risk is presented in terms of the number of cases out of 10,000 people exposed. Predicted carcinogenic risk estimates are generally an upper-bound value, because assumptions are typically made to intentionally overestimate potential exposure and toxicity.

For inhalation pathways, the average daily air concentration is converted to estimates of risk using the IUR value. Estimated daily intakes averaged over a lifetime of exposure are converted to estimates of risk using the slope factor for oral exposures (SFO) for non-inhalation pathways (mg/kg-day)<sup>-1</sup>.

For inhalation exposures, cancer risk is calculated as follows:

Lifetime Excess Cancer Risk – inhalation $_i = LAC_i \times IUR_i$ 

where:

LAC<sub>i</sub> = lifetime average concentration for chemical "i" (µg/m<sup>3</sup>)

 $IUR_i$  = inhalation unit risk value for chemical "i" ( $\mu g/m^3$ )<sup>-1</sup>

For non-inhalation exposures, cancer risk is calculated as follows for the dermal and ingestion pathways, respectively:

Lifetime Excess Cancer Risk – 
$$derm_i = LADD$$
- $dermal_i \times SFO_i/GIABS_i$   
Lifetime Excess Cancer Risk –  $ing_i = LADD$ - $ing_i \times SFO_i$ 

where:

LADD-derm<sub>i</sub> = lifetime average daily dose from dermal exposure for chemical

"i" (mg/kg-day)

LADD-ing<sub>i</sub> = lifetime average daily dose from ingestion exposure for chemi-

cal "i" (mg/kg-day)

SFO<sub>i</sub> = slope factor (oral) for chemical "i"  $(mg/kg-day)^{-1}$ 

GIABS<sub>i</sub> = fraction of contaminant absorbed in gastrointestinal tract for

chemical "i" (unitless)

The excess cancer risks for each chemical and exposure route are summed, regardless of tumor site (e.g., stomach cancer, lung cancer) to estimate the total excess cancer risk for the exposed individual:

Cumulative Lifetime Excess Cancer Risk

$$= \sum_{i=1}^{n} (Lifetime\ Excess\ Cancer\ Risk - inhalation_i)$$

+ Lifetime Excess Cancer Risk - non - inhalation<sub>i</sub>)

#### 5.1.2 Results of Carcinogenic Risk Assessment

Potential cancer risks were estimated for the inhalation, dermal, and incidental ingestion pathways, and cumulative lifetime excess cancer risk was summed as described in Section 5.1.1. The results are summarized in Table 8, and the detailed calculations are presented in Attachment 5. As shown in Table 8, the highest predicted risks resulted from inhalation exposure. Predicted risks from dermal contact and incidental ingestion were well below a target level of 1 excess cancer case in 10,000 workers in a 45-year working lifetime.

#### 5.1.2.1 Predicted Cancer Risks for Primary SEGs

Predicted theoretical excess cancer risks for inhalation exposure over a 45-year working lifetime for the primary SEGs as follows, with the primary chemical noted in the parentheses:

- 20 in 10,000 (0.2%) at Air Operations (hexavalent chromium)
- 30 in 10,000 (0.3%) at the small engine repair shop at the Breathing Apparatus Shop (benzene)

• 400 in 10,000 (4%) at the Eastern Fire Shop (tetrachloroethylene).

Another way to put these risks in context is to compare them to IARC's monograph that reviewed the carcinogenicity of firefighting (IARC, 2010). After the IARC Working Group summarized 42 epidemiologic studies of firefighting occupation and cancer risk (19 cohorts, 11 case-control studies, and 14 "other" studies) using meta-analyses for specific tumor types, persons who had ever held the occupation of a firefighter were found to be at a statistically significant increased risk of testicular cancer, prostate cancer, and non-Hodgkin's lymphoma compared to persons who had never been a firefighter (2010). The IARC Working Group's analysis of firefighters found that:

- There was an approximately ~50% increased risk of testicular cancer among firefighters compared with non-firefighters
- There was an approximately ~30% increased risk of prostate cancer among firefighters compared with non-firefighters
- There was an approximately ~20% increased risk of non-Hodgkin's lymphoma among firefighters compared with non-firefighters (IARC, 2010).

These estimates represent risk of cancer calculated using observational data of cancer rates among firefighters, rather than the theoretical risk estimates calculated herein for helicopter mechanics, equipment maintenance workers, and fire equipment mechanics. The theoretical estimated risks for the workers identified in this study are considerably lower than that measured among firefighters (0.2%-4% vs. 20-50%). As a point of reference, the risk of developing cancer at some point during their lifetime for persons in the US is approximately 39.5% (NCI, 2020). Note that this risk is baseline, not increased risk which is above baseline.

#### 5.1.2.2 Predicted Cancer Risks for Specific Activities

In addition to calculating risks for primary SEGs, some activity-specific risks were also calculated (Table 8). Theoretical excess cancer risks over a 45-year working lifetime were calculated by specific exposure routes for the following additional activities:

- Contact with Mastinox at Air Operations 0.3 in 10,000
- Inhalation of particles from welding/grinding/cutting activities at the Eastern Fire Shop 0.02 in 10,000
- Contact with residue on air packs at the Breathing Apparatus Shop 0.2 in 10,000
- Contact with residue on fire hoses at the fire-hose repair shop (part of the Breathing Apparatus Shop) 0.001 in 10,000

In all four cases, exposure was below the target level of 1 in 10,000.

#### 5.1.3 Uncertainties in the Quantitative Cancer Risk Assessment

In any risk assessment, estimates of potential carcinogenic risk and noncarcinogenic health effects have numerous associated uncertainties. Uncertainty is part of all four areas of risk assessment: the hazard identification/data evaluation, exposure assessment, toxicity assessment, and risk characterization. In this section, these uncertainties are discussed qualitatively, including whether the uncertainty may result in overestimation or underestimation of risk. For example, there is uncertainty in the toxicity criteria for the various COPCs, but those toxicity criteria are developed using conservative assumptions to ensure they are protective, and they are likely to overestimate actual risk.

#### 5.1.3.1 Hazard Identification/Data Evaluation

The focus of this risk assessment was on exposure to chemicals identified as carcinogens based on the evaluations in Tasks 1 and 2 and analyzed in Task 4 (ToxStrategies, 2020b,c,d). Specific chemicals of interest were evaluated for each SEG and location based on the *qualitative* risk ranking results conducted in Task 2. Specifically, all chemicals considered to present a qualitatively very high, high, or moderate potential risk were included in the assessment, and those considered trivial were not. However, given the very low potential for exposure to the excluded chemicals, the theoretical excess cancer risks have not been underestimated significantly.

Risks potentially associated with exposure to some chemicals identified in Task 2 could not be calculated because of the absence of regulatory toxicity criteria. Potential exposure to these chemicals is discussed qualitatively in Section 5.2.4.

#### 5.1.3.2 Exposure Assessment

Chemicals of potential concern were identified as those chemicals detected in at least one sample. Many chemicals were not detected in any samples and were reported as below a detection limit. To evaluate whether the detection limit was adequate for assessing potential risk, the same risk calculations applied to the detected concentrations were applied to the detection limits for those chemicals that were not detected in any samples (Attachment 5). The limits of detection used in this analysis are identified as exposure point concentrations in Attachment 1. As shown in Attachment 5-A, estimated risks for chemicals in PBZ samples at the detection limit ranged from 1 in 10,000 (diesel particulate matter) to 60 in 10,000 (naphthalene). This comparison demonstrates the very conservative nature of this assessment. Risk estimates associated with the detection limits are much lower than the maximum calculated risks, such that this uncertainty would not affect the conclusions of this report. For chemicals in surface wipe samples, only arsenic detection limits correspond to incidental ingestion risks (2 in 10,000) that are slightly above 1 in  $10.000.^{4}$ 

<sup>&</sup>lt;sup>4</sup> N,N-dimethyl-para-toluidine was not included in the evaluation of other chemicals that were not detected because an inhalation unit risk value was not available in the regulatory references for this chemical.

Crystalline silica was not detected in any of the PBZ air samples and did not have a IUR in the regulatory references. The lower bound of the detection limit for quartz ranged from 4.7 to  $6.4 \,\mu \text{g/m}^3$  which is approximately a factor of 10-fold lower than the OSHA PEL of  $50 \,\mu \text{g/m}^3$ . Theoretical excess cancer risk at the OSHA PEL for a working lifetime was calculated by OSHA as 5-23 cancers per 1,000 workers. As such the potential excess cancer risk at the limit of detection is approximately 5-23 in 10,000 workers (Federal Register, 2016).

Chemical concentrations were measured in multiple samples that were collected on the same day. This sampling approach addresses variability between workers and job tasks on a given day, but does not provide information on variability over time (e.g., different days). For example, the tetrachloroethylene concentrations are related to use of a specific NAPA® Lectra Clean® 3000 Energized Electrical Equipment Cleaner. Tetrachloroethylene contributed significantly to the calculated increased risk (360 in 10,000 in the Eastern Fire Shop). It is not known whether the use of the product on the sampling day was high, low, or equivalent compared to its use over time.

Exposure-point concentrations were the maximum detected concentrations for several chemicals because of the limited number of samples that were collected. These are identified in bold font in Tables 4 and 5. Use of the maximum concentration may overestimate potential exposures. For example, the maximum concentration of benzene used to estimate risk was detected in one of two samples at the Breathing Apparatus Shop (680  $\mu$ g/m³), which was more than twice the value of the other sample (300  $\mu$ g/m³).

Exposure assumptions were developed for the dermal contact and incidental ingestion exposure pathways that likely overestimated potential risk, because gloves are worn by the helicopter mechanics, equipment maintenance workers, and fire equipment mechanics when performing their tasks. Gloves may actually reduce the risk to 0, if there is no direct contact with the skin or opportunity for incidental ingestion. In the risk estimates, we assumed that the surfaces of three fingertips were uncovered eight to nine times per day (depending on the shift length). Even considering this overestimate for potential contact frequency, dermal contact and incidental ingestion were not considered significant exposure pathways with respect to potential carcinogenic risk.

One unique feature of the dioxin/furan and PCB TEQ concentrations used to estimate risk is that the total value for all congeners was calculated using one-half the detection limit to estimate the concentrations of congeners that were not detected. For many samples, the contribution to the TEQ from the congeners that were not detected was as high or higher than the contribution from the congeners that were detected. In general, this reflects the relatively low concentrations of these chemicals, which did not contribute significantly to theoretical risk.

Potential exposure for some SEGs could not be sampled, because the activities (specifically, painting/priming/sanding aircraft parts by a helicopter maintenance inspector at Air Operations and repair of fire apparatus by field-assigned mechanics at a wildfire base

camp) are intermittent and weren't occurring during sampling activities. These activities are discussed qualitatively in Section 5.2.

#### 5.1.3.3 Toxicity Assessment

Toxicity criteria used in this assessment are not measured precisely, like a measurement of distance, but are based on extrapolation of data from high concentrations at which an effect can be observed in humans or animals to much lower concentrations comparable to those present in the environment. To illustrate the variability in that interpretation, Table 9 presents the predicted risks for the three key chemicals contributing to inhalation risk (benzene, tetrachloroethylene, and hexavalent chromium) using the California criteria (Cal/EPA; basis for risk calculations in Attachment 5) and alternative potency measures. The risks are predicted using up to three different regulatory references for toxicity criteria: California's Environmental Protection Agency (Cal/EPA; basis for risk calculations in Attachment 5), USEPA, and NIOSH (22 CCR § 68400.5, 69020-69022, USEPA, 2020a; NIOSH, 2013). As shown in Table 9, risks estimated using Cal/EPA's toxicity criteria are approximately 4 to 20 times higher than risks using toxicity criteria from USEPA. NIOSH published an inhalation unit risk value for hexavalent chromium, and the predicted risk is approximately 5-times lower than risks predicted using Cal/EPA's toxicity criteria. It should be noted that although exposure frequency and duration are not consistent between the NIOSH unit risk estimate and our exposure scenarios, we corrected for the difference in our calculations to predict the risk estimates in Table 9.

Further, it is noteworthy that the NIOSH cancer potency estimate for hexavalent chromium was developed in 2013 using a robust data set (more than 2000 workers exposed from 1950-1980s) for whom exposures were characterized using an extensive exposure monitoring data set, and NIOSH quantitatively addressed the risk associated with smoking behavior. By comparison the California potency estimate, which was used in this evaluation, was developed in 1985, based on a very limited data set of fewer than 300 workers, exposed in the 1930s, and for which, no measures of hexavalent chromium were collected (CDHS, 1985). The NIOSH assessment is far superior technically than the highly dated assessment used in California, and it expected that the cancer risk associated with hexavalent chromium calculated using the California potency estimate is overestimated because of the dated analysis used to derive the California unit risk value. The cancer risk calculated using the NIOSH unit risk estimate is 5 in 10,000 (Table 9), and it is noteworthy that hexavalent chromium was only measurable in one sample from our study.

#### 5.1.3.4 Risk Characterization

These hypothetical risk calculations are based on estimates of both exposure and toxicity that, when combined, may compound the uncertainty in the risk estimates. As with any risk assessment, assumptions are required to quantify potential human exposure and risk. Most assumptions were conservative and overestimate potential exposure and risk. Those assumptions that potentially underestimated potential exposure and risk typically resulted in low or insignificant effects to the predictions.

It is also important to recognize the difference between calculated probabilities in the risk assessment and observed cancer incidence. The calculated risk probabilities are predictors of the likelihood of cancer based on numerous assumptions and models, many of which are designed to overestimate risk rather than underestimate it. This is not the same as identifying actual incidences of cancer in a specific population.

#### **5.2** Qualitative Discussion of Cancer Risks

This section discusses various potential exposures that could not be quantified. During sampling activities, representative concentrations could not be collected for a field-assigned fire equipment mechanic working at a wildfire base camp or a helicopter maintenance inspector at Air Operations painting/priming/sanding aircraft parts. During our visit to the Eastern Fire Shop on November 4, 2020, brake pads were observed with a Proposition 65 warning for the presence of carcinogens, but information regarding the chemical composition of the brake pads was not available for assessing potential exposure risks. Finally, some chemicals were not analyzed in the sampling effort, because regulatory toxicity criteria were not available to quantify potential risk. In the absence of those quantitative data, a qualitative discussion of potential carcinogenic risks is presented for each of these scenarios.

#### 5.2.1 Field-Assigned Fire Equipment Mechanic at a Wildfire Base Camp

As described in the Task 2 report (ToxStrategies, 2020c), the job of repairing fire apparatus or other equipment at a wildfire base camp or at a municipal fire site resulted in a "very high" risk ranking and was thus prioritized for the evaluation of cancer risk. Depending on the number of wildfires that occur each year, field mechanics may be called to a wildfire base camp for approximately 2-week durations, 24 hours per day. During these events, the mechanic wears work boots, a work uniform, gloves, eye protection, and N95 respirators. So, while this exposure may be more intense than daily work at the fire shop, it is also much less frequent (7.7% of their total year if they work for 28 days in the field per year and if they pull two shifts every fire season). There is also a great deal of variability in this potential exposure, depending on where the base camp is set up, which direction the wind is blowing, how far the base camp is from the active fire, and how many fires are contributing to air quality conditions. Given the infrequent occurrence (possibly 7.7% of a year) and shorter exposure duration (once every three years for 45 years), the potential exposures of field mechanics is not expected to be as high as exposures in the shop.

The carcinogens that were prioritized for the quantitative assessment (Task 4; ToxStrategies, 2020d) were acetaldehyde, benzene, ethylbenzene, naphthalene, diesel particulate, formaldehyde, and PAHs in air; and PAHs, chlorinated dioxins/furans, PCBs, pentachlorophenol, arsenic, and lead in surface wipes. Although the field-assigned fire equipment mechanic's exposure could not be assessed for these chemicals, Materna et al. (1992), characterized firefighters' exposures to acetaldehyde, benzene formaldehyde, and PAHs in air while working at northern California wildland fires between 1987 and 1989. These authors found that firefighter industrial hygiene samples collected during wildland firefighting demonstrated potential for low-level exposures to these carcinogens (Materna et al., 1992). As a point of comparison, benzene was sampled for at the Eastern Fire Shop

(PBZ air samples and area samples) and benzene was not detected ( $<71 \mu g/m^3$ ), while Materna et al., measured approximately 1,600  $\mu g/m^3$  at the active fire site. As such, it is recognized that exposure concentrations at active fires may exceed that which occurs at the shops, even though mechanics do not spend a significant fraction of their working lifetime at an active fire.

ToxStrategies estimates that the concentrations measured on the surface of a fire apparatus at a wildfire base camp would not likely result in risk above 1 in 10,000, based on the following rationales:

- The surface wipe samples collected at the Eastern Fire Shop on the fire apparatus that had been to a recent wildfire had detections that did not exceed the 1-in-10,000 risk level for the dermal or ingestion pathway.
- The surface wipe locations on the fire apparatus collected from the Eastern Fire Shop were areas that are not cleaned regularly and are not easily accessible; therefore, the dust that was captured on the wipe sample was an accumulation of fire residues from, presumably, several fire events (wildfires and/or municipal fires).
- The surface wipe samples collected on the aircraft that had recently been to a wildfire had detections that did not exceed the 1-in-10,000 risk level for the dermal or ingestion pathway.

#### 5.2.2 Helicopter Maintenance Inspector at Air Operations

In addition to the heavy and intermediate maintenance tasks, the helicopter maintenance inspector performs painting, priming, and sanding of aircraft components. This work can take place in the paint booth, inside the hangar, or outside in the open air, depending on the aircraft component. The carcinogenic chemicals associated with the painting tasks include methylene chloride, hexavalent chromium, 4-chlorobenzotrifluoride, and ethylbenzene. Based on discussions with the Air Operations staff, the painting work performed by the helicopter maintenance inspector typically takes place in the paint booth, and with the use of an airline respirator. The airline respirator effectively eliminates the inhalation pathway for exposure, because it supplies clean breathing air to the inspector. Although air concentrations of the chemicals could not be measured, because this activity was not conducted on the days of the exposure assessment, a supplied-air respirator, when properly fitted, has a protection factor of 1000, meaning that it reduces by 1000-fold the air concentrations of chemicals to which the wearer is exposed. Given the performance of the painting operations inside a ventilated paint booth and the use of a supplied-air respirator, the possibility for significant inhalation exposure is extremely low.

#### 5.2.3 Brake Pad Repair by a Shop-Assigned Fire Equipment Mechanic

During the quantitative exposure assessment site visit to the Eastern Fire Shop in Los Angeles on November 4, 2020, ToxStrategies observed Proposition 65 warning labels or generic "caution" labels on the packaging of some friction materials (e.g., brake pads, shoes, linings) used to maintain heavy-duty vehicles. These labels warned of potential cancer risk and/or reproductive harm. ToxStrategies subsequently requested copies of

Material Safety Data Sheets (MSDSs) or Safety Data Sheets (SDSs) for each of the friction materials. We received an MSDS for a brake lining supplied by Meritor Genuine, Product No. 292, dated January 7, 2013. This MSDS did not identify any potential for cancer risk or that the product was regulated under Proposition 65 (California Safe Drinking Water and Toxic Enforcement Act of 1986). In contrast, the packaging for other Meritor Genuine products observed during the site visit included a caution label regarding possible cancer risk. We have not received MSDSs or SDSs for the remaining friction products, nor were these documents readily available in the public domain. Accordingly, we have not included the potential cancer risk, if any, from exposure to friction material components in our evaluation. This issue could be investigated further as part of future health evaluations of fire equipment mechanics.

### 5.2.4 Chemicals Without Regulatory Toxicity Criteria

Exposure to six chemicals was not measured, because, although they have been identified as potential carcinogens, toxicity criteria were not available from the regulatory references evaluated. Specifically, diethanolamine and tetrahydrofuran are present in chemicals used for helicopter maintenance at Air Operations, and cumene, tetrabromobisphenol-A, methyl isobutyl ketone, and diethanolamine are present in chemicals used by fire equipment mechanics at the Eastern Fire Shop. Hence, theoretical excess cancer risks associated with exposure to these chemicals have not been assessed, and therefore, it is unknown what additional excess cancer risk, if any, would be posed by these chemicals.

### **6** Conclusions

A quantitative estimate of carcinogenic risk was calculated based on measurements and assumptions regarding chemicals of potential concern, exposure, and quantitative measures of carcinogenic potency. Several air and surface wipe samples were collected on a single day at each of three locations (Air Operations, the Breathing Apparatus Shop, and the Eastern Fire Shop) for the purpose of measuring exposure to chemicals from workplace exposures. Several chemicals were detected in one or more samples, which were identified as COPCs for the purpose of this evaluation. SEGs were identified in Task 2 of this project, which categorized the workers based on how they may be exposed during their workday. Exposure assumptions were developed for each SEG to quantify exposure rates. Inhalation, dermal contact, and incidental ingestion routes of exposure were evaluated for each of the SEGs.

Based on the results of the exposure and risk calculations performed herein, inhalation was identified as the exposure route that contributed most significantly to potential exposure and risk, although all measured concentrations were below PELs for all chemicals. A single chemical in air at each of the locations for each SEG was identified as contributing most significantly to risk estimates above the threshold of 1 in 10,000: hexavalent chromium at Air Operations (20 in 10,000), benzene at the Breathing Apparatus Shop (30 in 10,000), and tetrachloroethylene at the Eastern Fire Shop (400 in 10,000). Estimated risks for other SEGs and tasks were below 1 in 10,000. Data were not collected for field-assigned fire equipment mechanics and helicopter maintenance inspectors, because those activities did

not occur at the time of sampling. These SEGs are considered to have relatively low exposure potential because of the short duration and the use of personal protective equipment.

It is noteworthy that these risk estimates are based on current sampling data and are not reflective of past exposures. As worker safety and health practices typically improve with time, it is reasonable to assume that exposures in the past were higher and different than those quantified in this study.

The measured air concentrations of carcinogenic chemicals to which the helicopter mechanics, equipment maintenance workers, and fire equipment mechanics are exposed did not exceed the Cal/OSHA PELs; however, PELs are not always set to be protective of an increased cancer risk. Nevertheless, to reduce potential cancer risk, a variety of control measures consistent with the NIOSH hierarchy of controls (eliminate, substitution, engineering controls, administrative controls, and use of personal protective equipment) could be considered. Examples include:

- Eliminate tetrachloroethylene-containing products, replacing them with products that do not contain carcinogens.
- Increase ventilation in the Breathing Apparatus Shop to reduce benzene air concentrations.
- Identify work practices at Air Operations that increase the potential for airborne hexavalent chromium releases, and modify practices/procedures to reduce the exposure.

### 7 Next Steps

For Task 3, Epidemiologic Assessment, employee records are being evaluated for completeness and suitability for a future cancer epidemiology study.

Task 6 may include analyzing public comments, explaining the rationale for specific policy recommendations, and disseminating the study findings to the governor, state legislature, Occupational Safety and Health Standards Board, Los Angeles County Board of Supervisors, and stakeholders in the workers' compensation system.

### 8 References

AIHA (American Industrial Hygiene Association). 2015. A strategy for assessing and managing occupational exposures. Fourth Edition.

CDHS (California Department of Health Services). 1985. Health Assessment for Chromium. California Department of Health Services (later OEHHA, California Environmental Protection Agency), Berkeley and Sacramento, CA.

Cruzan et al. 2001. Chronic Toxicity/Oncogenicity Study of Styrene in CD-1 Mice by Inhalation Exposure for 104 Weeks. Journal of Applied Toxicology. 21: 185-198.

DTSC (Department of Toxic Substances Control). 2019. Human Health Risk Assessment (HHRA) Note Number 1. Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. April 9.

IARC (International Agency for Research on Cancer). 2010. IARC Monographs on the evaluation of carcinogenic risks to humans, Volume 98, Painting, firefighting, and shiftwork. Occupational Cancer Research Centre,

https://www.occupational cancer. ca/2010/iarc-monographs-volume-98-painting-firefighting-and-shiftwork/.

Federal Register. 2016. Occupational exposure to respirable crystalline silica; final rule. Department of Labor, Occupational Safety and Health Administration, 29 CFR Parts 1910, 1915, and 1926, March 25.

Knudsen GA, Hughes MF, McIntosh KL, Sanders JM, Birnbaum LS. 2015. Estimation of tetrabromobisphenol A (TBBPA) percutaneous uptake in humans using the parallelogram method. Toxicol Appl Pharmacol 1;289(2):323-329.

Kraeling ME, Yourick JJ, Bronaugh RL. 2004. In vitro human skin penetration of diethanolamine. Food Chem Toxicol 42:1553-1561.

Materna et al. 1992. Occupational exposures in California wildland fire fighting. Am Ind Hg Assoc J. 53(1): 69-76. January.

NCI (National Cancer Institute), 2020, Cancer statistics. September. Available at: https://www.cancer.gov/about-cancer/understanding/statistics

National Research Council. 1983. Risk Assessment in the Federal Government: Managing the Process. National Academy Press. Washington, D.C.

NIOSH (National Institute of Occupational Safety and Health). 2011. Current Intelligence Bulletin 63, Occupational Exposure to Titanium Dioxide. DHHS (NIOSH) Publication No. 2011-160, April.

NIOSH. 2013. Criteria for a recommended standard occupational exposure to hexavalent chromium. DHHS (NIOSH) Publication No. 2013-128, September.

NIOSH. 2017. Current intelligence bulletin 68: NIOSH chemical carcinogen policy. Publication 2017-100. July.

OEHHA (Office of Environmental Health Hazard Assessment). 2008. Proposition 65, Interpretive Guideline No. 2008-001, Guideline for hand-to-mouth transfer of lead through exposure to fishing tackle products. March.

OEHHA. 2010. Public Health Goals for Chemicals in Drinking Water: Styrene. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Sacramento, CA.

OEHHA (Office of Environmental Health Hazard Assessment). 2011a. Technical support document for cancer potency factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures, Appendix B. January (update; original, 2009).

OEHHA (Office of Environmental Health Hazard Assessment). 2011b. Public health goals for chemicals in drinking water, Hexavalent chromium (CrVI). July.

OEHHA. (Office of Environmental Health Hazard Assessment). 2012. Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis, August.

Riviere JE, Brooks JD, Monteiro-Riviere NA, Budsaba K, Smith CE. 1999. Dermal absorption and distribution of topically dosed jet fuels Jet-A, JP-8, and JP-8(100). Toxicol Appl Pharmacol 160:60–75.

ToxStrategies, Inc. 2020a. Proposal in response to RFP #4479, Assessment of risk of carcinogens exposure and incidents of occupational cancer among mechanics and cleaners of firefighting vehicles, Volume 1 — Proposal. February 13.

ToxStrategies, Inc. 2020b. Structured literature review of potential occupational exposures and cancer among mechanics who repair and clean firefighting vehicles (Task 1). August 24.

ToxStrategies, Inc. 2020c. Qualitative exposure assessment (Task 2). October 9.

ToxStrategies, Inc. 2020d. Quantitative exposure assessment (Task 4). December 11.

USEPA (U.S. Environmental Protection Agency). 1997. Health Effects Assessment Summary Tables (HEAST). U.S. Environmental Protection Agency, Washington, D.C., 1997.

USEPA (U.S. Environmental Protection Agency). 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).

USEPA (U.S. Environmental Protection Agency). 2008. Provisional peer reviewed toxicity values for cobalt (CASRN 7440-48-4), August 25.

USEPA (U.S. Environmental Protection Agency). 2020a. Regional Screening Levels (RSLs), November. Accessed at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

USEPA (U.S. Environmental Protection Agency). 2020b. Integrated Risk Information System (IRIS), December 14.

USEPA (U.S. Environmental Protection Agency). 2021a. Fact sheet: Arsenic RBA and IVBA, relative bioavailability and in vitro bioaccessibility of arsenic in soil. January 4. Accessed at: https://semspub.epa.gov/work/HQ/100002716.pdf

USEPA (U.S. Environmental Protection Agency). 2021b. Fact sheet: Lead RBA and IVBA, relative bioavailability and in vitro bioaccessibility of lead in soil. January 4. Accessed at: https://semspub.epa.gov/work/HQ/100002717.pdf

Wester RC, Maibach HI, Sedik L, Melendres J, Wade M, DiZio S. 1993. Percutaneous absorption of pentachlorophenol from soil. Fundam Appl Toxicol 20(1):68–71.

# Tables 1-9

Table 1. Job tasks and similar exposure groups evaluated in the cancer risk assessment

| Similar Exposure Group (SEG)                                   | Job Task                                                             | Location                                                            |
|----------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------|
|                                                                | Heavy maintenance on aircraft, including the task of oil leak checks | Air Operations, Pacoima                                             |
| nencopier mechanic                                             | Intermediate maintenance on aircraft                                 | Air Operations, Pacoima                                             |
| Helicopter maintenance inspector                               | Painting/priming/sanding aircraft parts                              | Air Operations, Pacoima                                             |
|                                                                | Repair and tune-up of power equipment and rescue tools               | Breathing Apparatus Shop, Pacoima                                   |
| Ефигритент планиенансе могкет                                  | Fire-hose repair                                                     | Breathing Apparatus Shop, Pacoima                                   |
| Shop-assigned fire equipment mechanic                          | Maintenance/repair on fire apparatus                                 | Eastern Fire Shop, Los Angeles, & North County Fire Shop, Lancaster |
| Field-assigned fire equipment mechanic Repair of fire apparatu | Repair of fire apparatus or other equipment at a wildfire base camp  | Wildfire base camp                                                  |
|                                                                |                                                                      |                                                                     |

Table 2. Exposure assumptions for similar exposure groups

| Description                                                | Parameter | Units                                              | Value               | Reference                                                |
|------------------------------------------------------------|-----------|----------------------------------------------------|---------------------|----------------------------------------------------------|
|                                                            |           | Inhalation Exposure Parameters                     | arameters           |                                                          |
| Respirator protection factor (welding only)                | PF        | ()                                                 | 10                  | CCR, Title 8, §5144. Respiratory Protection              |
| Exposure time (Air Operations_ratio)                       | $ET_AO_f$ | 9 hours/24 hours                                   | 0.38                | Site-specific                                            |
| Exposure time (Eastern Fire Shop_ratio)                    | ET_FS_f   | 9 hours/24 hours                                   | 0.38                | Site-specific                                            |
| Exposure time                                              | ET        | 8 hours/24 hours                                   | 0.33                | Site-specific                                            |
| Exposure frequency 1 (Air Operations)                      | EF_1      | 280 days/365 days                                  | 0.77                | Site-specific                                            |
| Exposure frequency 2 (Breathing Apparatus Shop)            | EF_2      | 262 days/365 days                                  | 0.72                | Site-specific                                            |
| Exposure frequency 3 (Eastern Fire Shop)                   | EF_3      | 247 days/365 days                                  | 89.0                | Site-specific                                            |
| Exposure frequency 4 (welding at the Eastern Fire Shop)    | EF_4      | 12 days/365                                        | 0.033               | Site-specific                                            |
| Exposure duration                                          | ED        | 45 years/70 years                                  | 0.64                | NIOSH, 2017                                              |
|                                                            | Dermal Co | Dermal Contact and incidental Ingestion Parameters | ngestion Parameters |                                                          |
| Surface area of the fingers                                | SAf       | $cm^2$                                             | 19                  | OEHHA, 2008                                              |
| Event Frequency (Air Operations)                           | EV_AO     | events per day                                     | 6                   | Site-specific; one contact per hour for 9 hours          |
| Event Frequency (Eastern Fire Shop)                        | EV_FS     | events per day                                     | 6                   | Site-specific; one contact per hour for 9 hours          |
| Event Frequency (Breathing Apparatus Shop)                 | EV        | events per day                                     | 8                   | Site-specific; one contact per hour for 8 hours          |
| Event Frequency (Air Operations - Mastinox)                | EV_M      | events per day                                     | 1                   | Site-specific; one contact per day                       |
| Percent absorption                                         | Abs       | %                                                  | Chemical-specific   | Chemical specific                                        |
| Fraction of contaminant absorbed in gastrointestinal tract | GIABS     | unitless                                           | Chemical-specific   | Chemical specific                                        |
| Direct transfer factor                                     | Fdirect   | ratio                                              | 0.5                 | OEHHA, 2008                                              |
| Relative bioavailability (arsenic and lead only)           | RBA       | %                                                  | Chemical-specific   | USEPA, 2021a and 2021b                                   |
| Contacts per hour                                          | λ-d       | per hour                                           | 1                   | Site-specific; one contact per hour                      |
| Exposure time (Air Operations)                             | ET_AO     | hours per day                                      | 6                   | Site-specific; 9-80 work week                            |
| Exposure time (Eastern Fire Shop)                          | ET_FS     | hours per day                                      | 6                   | Site-specific; 9-80 work week                            |
| Exposure time (Breathing Apparatus Shop)                   | ET_hours  | hours per day                                      | 8                   | Site-specific; 40-hour, 5-day work week                  |
| Exposure time_Mastinox                                     | ET_M      | hours per day                                      | 1                   | Site-specific; one contact per day                       |
| Exposure frequency 1 (Air Operations)                      | EF_AO     | days/year                                          | 280                 | Site-specific; 225 9-hour days and 500 hours of overtime |
| Exposure frequency 2 (Breathing Apparatus Shop)            | EF_BA     | days/year                                          | 262                 | Site-specific; 250 8-hour days and 100 hours of overtime |
| Exposure frequency 3 (Eastern Fire Shop)                   | EF_FS     | days/year                                          | 247                 | Site-specific; 250 8-hour days and 200 hours of overtime |
| Exposure frequency 4 (Air Operations - Mastinox)           | EF_M      | days/year                                          | 168                 | Site-specific; contact with Mastinox 14 times per month  |
| Exposure duration                                          | ED_y      | years                                              | 45                  | NIOSH, 2017                                              |
| Averaging time                                             | ATca      | days                                               | 25550               | DTSC, 2019                                               |
| Body weight                                                | BW        | kilograms                                          | 80                  | DTSC, 2019                                               |

# References

DTSC (Department of Toxic Substances Control). 2019. Human Health Risk Assessment (HHRA) Note Number 1. Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. April 9.

NIOSH. 2017. Current intelligence bulletin 68: NIOSH chemical carcinogen policy. Publication 2017-100. July.

OEHHA (Office of Environmental Health Hazard Assessment). 2008. Proposition 65, Interpretive Guideline No. 2008-001, Guideline for hand-to-mouth transfer of lead through exposure to fishing tackle products. March.

USEPA (US Environmental Protection Agency). 2021a. Fact sheet: Arsenic RBA and IVBA, relative bioavailability and in vitro bioaccessibility of arsenic in soil. January 4. Accessed at: https://semspub.epa.gov/work/HQ/100002716.pdf

USEPA (US Environmental Protection Agency). 2021b. Fact sheet: Lead RBA and IVBA, relative bioavailability and in vitro bioaccessibility of lead in soil. January 4. Accessed at: https://semspub.epa.gov/work/HQ/100002716.pdf

Table 3. Chemical-specific exposure factors

|                                     |         |              |            |              | Dermal     |                       |
|-------------------------------------|---------|--------------|------------|--------------|------------|-----------------------|
|                                     |         |              | GIABS      |              | Absorption |                       |
| Chemical                            | RBA (%) | Reference    | (unitless) | Reference    | (%)        | Reference             |
| Arsenic                             | 09      | USEPA, 2021a | 1          | USEPA, 2020a | 9          | OEHHA, 2012           |
| Benzo(a)pyrene and PAHs             | 100     | Default      | 1          | USEPA, 2020a | 13         | ОЕННА, 2012           |
| Diethanolamine                      | 100     | Default      | 1          | USEPA, 2020a | 1          | Kraeling et al., 2004 |
| Hexavalent chromium                 | 100     | Default      | 0.025      | USEPA, 2020a | 2          | OEHHA, 2012           |
| Lead                                | 09      | USEPA, 2021b | 1          | USEPA, 2020a | 3          | OEHHA, 2012           |
| Naphthalene                         | 100     | Default      | 1          | USEPA, 2020a | 1.17       | Riviere et al., 1999  |
| Pentachlorophenol                   | 100     | Default      | 1          | USEPA, 2020a | 25         | Wester et al., 1993   |
| PCBs (Total)                        | 100     | Default      | 1          | USEPA, 2020a | 14         | OEHHA, 2012           |
| Tetrabromobisphenol-A               | 100     | Default      | 1*         | USEPA, 2020a | 6          | Knudsen et al., 2015  |
| 2,3,7,8-Tetrachlorodibenzo-p-dioxin | 100     | Default      | 1          | USEPA, 2020a | 3          | ОЕННА, 2012           |
|                                     |         |              |            |              |            |                       |

## Notes

GIABS = Fraction of contaminant absorbed in gastrointestinal tract (unitless)

RBA = Relative bioavailability

\* = Bisphenol A selected as surrogate chemical for selection of GIABS

# References

Knudsen GA, Hughes MF, McIntosh KL, Sanders JM, Birnbaum LS. 2015. Estimation of tetrabromobisphenol A (TBBPA) percutaneous uptake in humans using the parallelogram method. Toxicol Appl Pharmacol 1;289(2):323-329.

Kraeling ME, Yourick JJ, Bronaugh RL. 2004. In vitro human skin penetration of diethanolamine. Food Chem Toxicol 42:1553-1561.

OEHHA. 2012. Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis, August.

Riviere JE, Brooks JD, Monteiro-Riviere NA, Budsaba K, Smith CE. 1999. Dermal absorption and distribution of topically dosed jet fuels Jet-A, JP-8, and JP-8(100). Toxicol Appl Pharmacol 160:60-75.

USEPA. 2020a. Regional Screening Levels (RSLs), November.

USEPA, 2021a. Fact Sheet: Arsenic RBA and IVBA, Relative Bioavailability and In Vitro Bioaccessibility of Arsenic in Soil. January 4.

USEPA, 2021b. Fact Sheet: Lead RBA and IVBA, Relative Bioavailability and In Vitro Bioaccessibility of Lead in Soil. January 4.

Wester RC, Maibach HI, Sedik L, Melendres J, Wade M, DiZio S. 1993. Percutaneous absorption of pentachlorophenol from soil. Fundam Appl Toxicol 20(1):68-71.

Table 4. Representative concentrations for exposure evaluations based on personal breathing zone samples  $(\mu g/m^3)$ 

|                                                                             |                             | Number of<br>Samples for       |              |         |              |                                       |             |         | F              | Diesel<br>Particulate  |          |
|-----------------------------------------------------------------------------|-----------------------------|--------------------------------|--------------|---------|--------------|---------------------------------------|-------------|---------|----------------|------------------------|----------|
| ob Task                                                                     | Location                    | Exposure rount<br>Calculations | Acetaldehyde | Benzene | Ethylbenzene | Ethylbenzene Formaldehyde Naphthalene | Naphthalene | Styrene | chloroethylene | as Elementai<br>Carbon | Chromium |
| intermediate & heavy naintenance on aircraft                                | Air Operations              | 5                              | -            |         | 1            | 1                                     | -           | -       | -              | -                      | <0.072   |
| Heavy maintenance on<br>nircraft                                            | Air Operations              | 3                              | -            | 1       | -            | 1                                     | -           | -       | 1              | 1                      | 0.084    |
| ntermediate maintenance on<br>uircraft                                      | Air Operations              | 9                              | -            | <61     | 06L>         | 1                                     | 088>        | -       | 1              | 1                      | 1        |
| General work in hangar                                                      | Air Operations              | 2                              |              | <58     | 052>         | -                                     | <840        |         |                |                        |          |
| Repair and tune-up of<br>power equipment in the<br>small-engine repair shop | Breathing<br>Apparatus Shop | 2                              | 7.2          | 089     | 0001>        | 28                                    | <1,200      | 066>    | 1              | -                      |          |
| Maintenance and repair on fire apparatus                                    | Eastern Fire Shop           | 9                              | -            | <71     | 0£6>         | 1                                     | <1000       | -       | 35,667         | <2.5                   | ı        |
| Maintenance and repair on<br>fre apparatus - Welding                        | Eastern Fire Shop           | 2                              | -            | ı       | -            | ı                                     | -           | -       | ı              | 1                      | <0.10    |
| General work in Eastern<br>Fire Shop                                        | Eastern Fire Shop           | 2                              | -            | <66     | 098>         | -                                     | <950        |         | -              | <2.1                   | -        |
|                                                                             |                             |                                |              |         |              |                                       |             |         |                |                        |          |

|                                                                             |                             | Number of<br>Samples for<br>Exposure Point |         |           |         |        |       |        | N,N-Dimethyl-  |        | Respirable Crystalline Silica | ilica     |
|-----------------------------------------------------------------------------|-----------------------------|--------------------------------------------|---------|-----------|---------|--------|-------|--------|----------------|--------|-------------------------------|-----------|
| Job Task                                                                    | Location                    | Calculations                               | Arsenic | Beryllium | Cadmium | Cobalt | Lead  | Nickel | Para-Toluidine | Quartz | Cristobalite                  | Tridymite |
| Intermediate & heavy maintenance on aircraft                                | Air Operations              | -                                          | -       | -         | -       |        | -     |        | -              |        |                               | :         |
| Heavy maintenance on<br>aircraft                                            | Air Operations              | 9                                          | 1       | -         | 1       | -      | 1     |        | 1              | <6.4   | 4.9>                          | <25       |
| Intermediate maintenance on aircraft                                        | Air Operations              | ı                                          | 1       | -         | -       |        | 1     | -      | 1              | -      | -                             | ŀ         |
| General work in hangar                                                      | Air Operations              | =                                          |         |           | -       |        |       |        | -              | :      |                               | -         |
| Repair and tune-up of<br>power equipment in the<br>small-engine repair shop | Breathing<br>Apparatus Shop | -                                          | -       | -         | -       | 1      | -     | -      | ı              | -      | -                             | 1         |
| Maintenance and repair on fire apparatus                                    | Eastern Fire Shop           | 5                                          | 1       | -         | 1       | -      | ı     |        | <0.51          | -      |                               | -         |
| Maintenance and repair on<br>fire apparatus - Welding                       | Eastern Fire Shop           | 2                                          | <4.3    | <0.021    | <0.13   | 0.18   | <0.85 | 6.1    | ı              | -      |                               | :         |
| General work in Eastern<br>Fire Shop                                        | Eastern Fire Shop           | -                                          | -       |           | :       |        | 1     |        | 1              |        |                               | 1         |

Notes

Bold font indicates maximum value used as representative concentration when fewer than five samples collected.

Regular font represents detection limits or average values for data sets with more than five detections.

 $\frac{Abbreviations}{--=data not collected} \\ \mu g/m^3 = microgram per cubic meter$ 

Table 5. Representative concentrations for exposure evaluations based on surface wipe samples (µg/cm²)

| Job Task     Location       Intermediate & heavy     Air       maintenance on aircraft     Operations       Intermediate & heavy     Air       maintenance on aircraft     Operations | Sample Description Various engine or | Calculations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Chromium Chromium |              |           | Pentachloro-                                             |                      | Non-TEQ | Furan (D/F) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|-----------|----------------------------------------------------------|----------------------|---------|-------------|
|                                                                                                                                                                                       | ne                                   | CHICATAN CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTR | (CrVI)            | Arsenic (As) | Lead (Pb) | Arsenic (As) Lead (Pb) phenol (PCP) PCB-TEQ <sup>1</sup> | PCB-TEQ <sup>1</sup> | $PCB^2$ | $TEQ^{1}$   |
|                                                                                                                                                                                       | e                                    | As/Pb - 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |              |           |                                                          |                      |         |             |
|                                                                                                                                                                                       |                                      | Cr(VI) - 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.0014            | <0.063       | 0.016     | ŀ                                                        | 1.2E-09              | 2.9E-06 | 1.5E-08     |
|                                                                                                                                                                                       | ancian pans                          | PCB & D/F - 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |              | _         |                                                          |                      |         |             |
| maintenance on aircraft Operations                                                                                                                                                    | Mastinox on aircraft                 | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.54              |              |           |                                                          |                      |         |             |
|                                                                                                                                                                                       | parts                                | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 45.0              |              |           | :                                                        | -                    |         |             |
| Repair of air packs Breathing                                                                                                                                                         |                                      | As/Pb - 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |              |           |                                                          |                      |         |             |
| Apparatus                                                                                                                                                                             | Air Packs                            | PCP - 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                 | <0.063       | 0.023     | <0.0050                                                  | 1.8E-09              | 2.1E-05 | 3.0E-08     |
| Shop                                                                                                                                                                                  |                                      | PCB & D/F - 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |              | _         |                                                          |                      |         |             |
| Fire hose repair Breathing                                                                                                                                                            |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |              |           |                                                          |                      |         |             |
| Apparatus                                                                                                                                                                             | Fire hose                            | As/Pb - 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ł                 | <0.063       | 0.039     | 1                                                        | 1                    | 1       | 1           |
| Shop                                                                                                                                                                                  |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |              |           |                                                          |                      |         |             |
| Maintenance and repair   Eastern Fire   Fire Apparatus                                                                                                                                | Fire Apparatus                       | As/Pb/PCP - 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   | 6900         | 21.0      | 03000                                                    | 3 85 00              | 4 1E 05 | 2 1 1 0 0 0 |
| on fire apparatus Shop                                                                                                                                                                |                                      | PCB & D/F - 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ŀ                 | 500.0/       | 0.10      | 00000                                                    | 7.0E-09              | 4.1E-03 | 7.1E-00     |

| ,                                                      | ,            |                      | Number of Samples<br>for Exposure Point | Benzo(a)-  | 5        | Benzo(b)-               |             | Benzo(a)- | Indeno<br>(1,2,3- | Dibenzo<br>(a,h)anthrac |             |
|--------------------------------------------------------|--------------|----------------------|-----------------------------------------|------------|----------|-------------------------|-------------|-----------|-------------------|-------------------------|-------------|
| Job Task                                               | Location     | Sample Description   | Calculations                            | anthracene | Chrysene | Huoranthene Huoranthene | Huoranthene | pyrene    | cd)pyrene         | ene                     | Naphthalene |
| Intermediate & heavy                                   | Air          | Various engine or    | 12                                      | 05000/     | 05000    | 0500 0/                 | 05000       | 05000/    | 05000/            | 05000/                  | 05000/      |
| maintenance on aircraft                                | Operations   | aircraft parts       | 71                                      | 00000      | 00000    | 00000                   | 0000        | 00000     | 00000             | 00000/                  | 00000/      |
| Intermediate & heavy                                   | Air          | Mastinox on aircraft |                                         |            |          |                         |             |           |                   |                         |             |
| maintenance on aircraft                                | Operations   | parts                |                                         |            |          |                         |             | -         |                   |                         |             |
| Repair of air packs                                    | Breathing    |                      |                                         |            |          |                         |             |           |                   |                         |             |
|                                                        | Apparatus    | Air Packs            | 9                                       | 0.017      | 0.018    | 0.029                   | 0.0055      | 0.015     | 0.012             | 0.003                   | 0.0051      |
|                                                        | Shop         |                      |                                         |            |          |                         |             |           |                   |                         |             |
| Fire hose repair                                       | Breathing    |                      |                                         |            |          |                         |             |           |                   |                         |             |
|                                                        | Apparatus    | Fire hose            | 9                                       | <0.0050    | <0.0050  | <0.0050                 | <0.0050     | <0.0050   | <0.0050           | <0.0050                 | <0.0050     |
|                                                        | Shop         |                      |                                         |            |          |                         |             |           |                   |                         |             |
| Maintenance and repair   Eastern Fire   Fire Apparatus | Eastern Fire | Fire Apparatus       | 9                                       | 050000     | 05000    | 0500 0~                 | 030000      | 050000    | 03000/            | 030000                  | 03000       |
| on fire apparatus                                      | Shop         |                      | 0                                       | ~0.0030    | ~0.0050  | ~0.0030                 | 0.00.0      | 0.00.0    | ~0.0030           | ~0.0050                 | ~0.0030     |
|                                                        |              |                      |                                         |            |          |                         |             |           |                   |                         |             |

1. The analytical results for dioxins/furans and 12 PCB congeners with a toxicity equivalency factor (TEF) were converted to a 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalence (TEQ) concentration. Congeners that were non-detects were assigned values equal to 50% of the reporting limit for calculating the dioxin/furan/PCB TEQ totals for each sample.

2. The non-TEQ PCBs total are calculated by summing the individual congeners without a TEF. Congeners that were non-detects were assigned values equal to 50% of the reporting limit for calculating the non-

TEQ PCB totals for each sample. **Bold** font indicates maximum value used as representative concentration when fewer than five samples collected.

Regular font represents detection limits or average values for data sets with more than five detections.

Abbreviations
PCB = polychlorinated biphenyl
TEQ = toxicity equivalency

-- = data not collected

 $\mu g/cm^2 = microgram per square centimeter$ 

Table 6. Toxicity criteria for carcinogenic effects based on inhalation exposure

| 7-1<br>1-1<br>1-1<br>1-1<br>1-1<br>1-1<br>1-1<br>1-1<br>1-1<br>1-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source  Source | Toxicologic Endpoint  Nasal tumors in rats  Lung cancer in humans  Lung cancer in humans  Lung cancer in humans  Lung tumors in rats and mice   Lung cancer in humans  Renal tumors in rats  Nasal tumors in rats  Kenal tumors in rats  Kenal tumors in rats  Kenal tumors in rats  Lung cancer in humans  Renal tumors in rats  Nasal tumors in rats  Kahal tumors in rats                             | Respiratory system Respiratory system Lymphatic system Lymphatic system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system |
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| ively Assessed Chemicals (analyzed chemicals)  yde                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Source  10 10 11 12 CCR § 68400.5, 69020-69022 13 11 IRIS (USEPA, 2020b) 13 12 CCR § 68400.5, 69020-69022 13 12 CCR § 68400.5, 69020-69022 13 12 CCR § 68400.5, 69020-69022 13 14 OEHHA (2011a) 15 OEHHA (2011a) 16 OEHHA (2011a) 17 18 CCR § 68400.5, 69020-69022 18 CCR § 68400.5, 69020-69022 19 CCR § 68400.5, 69020-69022 10 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | asal tumors in rats ung cancer in humans ung cancer in humans ung cancer in humans ung cancer in humans ung tumors in rats and mice ung tumors in rats and mice ung cancer in humans asal tumors in rats asal tumors in rats asal tumors in rats asal tumors in rats and cancer in humans in rats asal tumors in rats asal tumors in rats and cancer in humans and cancer in humans idney tumors in rats | Respiratory system Respiratory system Lymphatic system Respiratory system Respiratory system Respiratory system Respiratory system Respiratory system Urinary system Respiratory system Urinary system Respiratory system                                             |
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| ehyde 75-07-0 2.7E-06 7440-38-2 4.3E-03 cs 71-43-2 2.9E-05 cs 71-43-2 2.9E-05 cs 71-43-2 2.9E-05 cs 7440-43-9 4.2E-03 cs 7440-43-9 4.2E-03 cs 7440-43-9 9.0E-03 cs 7440-43-9 9.0E-03 cs 7440-43-9 1.3E-04 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7440-62-0 1.3E-05 cs 7460-62-0 1.3E | 2.7E-06 22 CCR § 68400.5, 69020-69022 4.3E-03 IRIS (USEPA, 2020b) 2.9E-05 22 CCR § 68400.5, 69020-69022 2.4E-03 IRIS (USEPA, 2020b) 4.2E-03 22 CCR § 68400.5, 69020-69022 9.0E-03 PPRTV (USEPA, 2008) -7 5 3.0E-04 OEHHA (2011a) 2.5E-06 OEHHA (2011a) 1.3E-05 IRIS (USEPA, 2020b) 9 1.5E-01 22 CCR § 68400.5, 69020-69022 1.7E-05 OEHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | asal tumors in rats ung cancer in humans eukemia in humans ung cancer in humans ung cancer in humans ung tumors in rats and mice ung cancer in humans enal tumors in rats asal tumors in rats asal tumors in rats in rats asal tumors in rats asal tumors in rats in rats asal tumors in rats in rats asal tumors in rats in rats and cancer in humans in rats                                           | Respiratory system Respiratory system Lymphatic system/ Nervous system Respiratory system Respiratory system                                                                                                                                                          |
| 7440-38-2   4.3E-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4.3E-03 IRIS (USEPA, 2020b) 2.9E-05 22 CCR § 68400.5, 69020-69022 2.4E-03 IRIS (USEPA, 2020b) 4.2E-03 22 CCR § 68400.5, 69020-69022 9.0E-03 PPRTV (USEPA, 2008) -7 5 3.0E-04 OEHHA (2011a) 2.5E-06 OEHHA (2011a) 1.3E-05 IRIS (USEPA, 2020b) 9 1.5E-01 22 CCR § 68400.5, 69020-69022 1.7E-05 OEHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ung cancer in humans eukemia in humans ung cancer in humans ung tumors in rats and mice ung tumors in rats and tumors in rats asal tumors in rats asal tumors in rats and tumors in rats and tumors in rats and tumors in rats and tumors in rats and tumors in rats and tumors in rats                                                                                                                  | Respiratory system Lymphatic system/ Nervous system Respiratory system Respiratory system                                                                                                                                                                             |
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| m 7440-43-9 4.2E-03 7440-48-4 9.0E-03 7440-48-4 9.0E-03 7440-48-4 9.0E-03 7440-48-4 9.0E-03 7440-48-4 9.0E-03 7440-48-4 9.0E-04 761736615 3.0E-04 761736615 3.0E-04 761736615 3.0E-04 76173615 1.2E-05 76173615 1.2E-05 76173615 1.2E-05 7617361616161616161616161616161616161616                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.2E-03 22 CCR § 68400.5, 69020-69022 9.0E-03 PPRTV (USEPA, 2008)  -7 5 3.0E-04 OEHHA (2011a) 2.5E-06 OEHHA (2011a) 1.3E-05 IRIS (USEPA, 2020b) 9 1.5E-01 22 CCR § 68400.5, 69020-69022 1.2E-05 OEHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ung cancer in humans ung tumors in rats and mice ung cancer in humans enal tumors in rats asal tumors in rats ung cancer in humans idney tumors in rats                                                                                                                                                                                                                                                  | Respiratory system                                                                                                                                                                                                                                                    |
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| ine silica 14808–60–7 articulate E17136615 3.0E-04 nzene 100-41-4 2.5E-06 lehyde 50-00-0 1.3E-05 lent chromium 18540-29-9 1.5E-01 7439-92-1 1.2E-05 7440-02-0 2.6E-04 nethyl-para-toluidine 99-97-8 loroethylene 127-18-4 6.1E-06 slene 91-20-3 3.4E-05 nathracene 56-55-3 1.1E-04 ne 218-01-9 1.1E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2.5E-06 OEHHA (2011a) 1.3E-05 IRIS (USEPA, 2020b) 1.5E-01 22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ung cancer in humans enal tumors in rats asal tumors in rats ung cancer in humans idney tumors in rats                                                                                                                                                                                                                                                                                                   | Respiratory system Urinary system Respiratory system Respiratory system                                                                                                                                                                                               |
| articulate E17136615 3.0E-04 nzene 100-41-4 2.5E-06 lehyde 50-00-0 1.3E-05 lent chromium 18540-29-9 1.5E-01 7439-92-1 1.2E-05 7440-02-0 2.6E-04 nethyl-para-toluidine 99-97-8 loroethylene 127-18-4 6.1E-06 loroethylene 127-18-4 6.1E-06 slene 56-55-3 1.1E-04 nethylene 56-55-3 1.1E-04 nethylene 56-55-3 1.1E-04 nethylene 56-55-3 1.1E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S   3.0E-04   OEHHA (2011a)   2.5E-06   OEHHA (2011a)   1.3E-05   IRIS (USEPA, 2020b)   1.5E-01   2.2 CCR § 68400.5, 69020-69022   1.5E-05   OEHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ung cancer in humans enal tumors in rats asal tumors in rats ung cancer in humans idney tumors in rats                                                                                                                                                                                                                                                                                                   | Respiratory system Urinary system Respiratory system Respiratory system                                                                                                                                                                                               |
| lehyde 50-00-0 1.3E-05 lehyde 50-00-0 1.3E-05 lent chromium 18540-29-9 1.5E-01 1439-92-1 1.2E-05 1440-02-0 2.6E-04 nethyl-para-toluidine 99-97-8 loroethylene 127-18-4 6.1E-06 loroethylene 91-20-3 3.4E-05 londhracene 56-55-3 1.1E-04 nethylene 1218-01-9 1.1E-05 londhracene 56-55-3 1.1E-04 nethylene 100-41-6 1.1E-05 londhracene 56-55-3 1.1E-04 nethylene 100-41-6 londhracene 100-41-6 l    | 2.5E-06 OEHHA (2011a)<br>1.3E-05 IRIS (USEPA, 2020b)<br>-9 1.5E-01 22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | enal tumors in rats asal tumors in rats ung cancer in humans idney tumors in rats                                                                                                                                                                                                                                                                                                                        | Urinary system Respiratory system Respiratory system                                                                                                                                                                                                                  |
| lent chromium 18540-29-9 1.3E-05 lent chromium 18540-29-9 1.5E-01 7439-92-1 1.2E-05 7440-02-0 2.6E-04 lent chyl-para-toluidine 99-97-8 loroethylene 127-18-4 6.1E-06 lend                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.3E-05 IRIS (USEPA, 2020b)  -9 1.5E-01 22 CCR § 68400.5, 69020-69022  1 7E-05 OFHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | asal tumors in rats ung cancer in humans idney tumors in rats                                                                                                                                                                                                                                                                                                                                            | Respiratory system Respiratory system                                                                                                                                                                                                                                 |
| lent chromium 18540-29-9 1.5E-01 7439-92-1 1.2E-05 7440-02-0 2.6E-04 nethyl-para-toluidine 99-97-8 100-42-5 7.4E-06 oroethylene 127-18-4 6.1E-06 127-18-4 6.1E-06 1127-18-4    | -9 1.5E-01 22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ung cancer in humans<br>idney tumors in rats                                                                                                                                                                                                                                                                                                                                                             | Respiratory system                                                                                                                                                                                                                                                    |
| nethyl-para-toluidine 99-97-8 1.2E-05  nethyl-para-toluidine 99-97-8  loroethylene 100-42-5 7.4E-06  loroethylene 127-18-4 6.1E-06  alene 91-20-3 3.4E-05  n)anthracene 56-55-3 1.1E-04  ne 218-01-9 1.1E-05  olythoranthene 205-00-2 1.1E-04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 1 2E-05 OFHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | idney tumors in rats                                                                                                                                                                                                                                                                                                                                                                                     | I Tringery eyetem                                                                                                                                                                                                                                                     |
| nethyl-para-toluidine 99-97-8  loroethylene 100-42-5 7.4E-06  loroethylene 127-18-4 6.1E-06  alene 91-20-3 3.4E-05  l)anthracene 56-55-3 1.1E-04  ne 218-01-9 1.1E-05  logonarytene 105-00-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (======================================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                          | Utilially system                                                                                                                                                                                                                                                      |
| nethyl-para-toluidine         99-97-8            lon-42-5         7.4E-06           loroethylene         127-18-4         6.1E-06           alene         91-20-3         3.4E-05           n)anthracene         56-55-3         1.1E-04           ne         218-01-9         1.1E-05           o)fluoranthene         205-00-2         1.1E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.6E-04   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Lung cancer in humans                                                                                                                                                                                                                                                                                                                                                                                    | Respiratory system                                                                                                                                                                                                                                                    |
| Incoethylene         127-18-4         6.1E-06           Incoethylene         91-20-3         3.4E-05           Incoethylene         91-20-3         1.1E-04           Incoethylene         56-55-3         1.1E-04           Incoethylene         218-01-9         1.1E-05           Incoethylene         205-00-3         1.1E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                       |
| Iloroethylene         127-18-4         6.1E-06           nalene         91-20-3         3.4E-05           (a) anthracene         56-55-3         1.1E-04           ne         218-01-9         1.1E-05           h) fluoranthene         205-00-2         1.1E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 7.4E-06 ToxStrategies derived (OEHHA, 2010; Cruzan et al., 2001)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Lung tumors in mice                                                                                                                                                                                                                                                                                                                                                                                      | Respiratory system                                                                                                                                                                                                                                                    |
| alene       91-20-3       3.4E-05         (a) anthracene       56-55-3       1.1E-04         nne       218-01-9       1.1E-05         h) fluoranthene       205-09-2       1.1E-04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6.1E-06   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Liver tumors in mice                                                                                                                                                                                                                                                                                                                                                                                     | Digestive system                                                                                                                                                                                                                                                      |
| 91-20-3 3.4E-05<br>56-55-3 1.1E-04<br>218-01-9 1.1E-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                       |
| 56-55-3 1.1E-04<br>218-01-9 1.1E-05<br>205-09-2 1.1E-04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3.4E-05 OEHHA (2011a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Nasal tumors and nasal olfactory tumors in rats                                                                                                                                                                                                                                                                                                                                                          | Respiratory system                                                                                                                                                                                                                                                    |
| 218-01-9 1.1E-05<br>205-99-2 1.1E-04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.1E-04   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Respiratory tract tumors in hamsters                                                                                                                                                                                                                                                                                                                                                                     | Respiratory system                                                                                                                                                                                                                                                    |
| 205-99-2 1 1E-04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.1E-05   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Respiratory tract tumors in hamsters                                                                                                                                                                                                                                                                                                                                                                     | Respiratory system                                                                                                                                                                                                                                                    |
| 1.11 01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.1E-04   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Respiratory tract tumors in hamsters                                                                                                                                                                                                                                                                                                                                                                     | Respiratory system                                                                                                                                                                                                                                                    |
| Benzo(k)fluoranthene   207-08-9   1.1E-04   22 CCR § 68400.5, 69020-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.1E-04   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Respiratory tract tumors in hamsters                                                                                                                                                                                                                                                                                                                                                                     | Respiratory system                                                                                                                                                                                                                                                    |
| Benzo(a)pyrene 50-32-8 1.1E-03 22 CCR § 68400.5, 69020-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.1E-03 22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Respiratory tract tumors in hamsters                                                                                                                                                                                                                                                                                                                                                                     | Respiratory system                                                                                                                                                                                                                                                    |
| Indeno(1,2,3-cd)pyrene 193-39-5 1.1E-04 22 CCR § 68400.5, 69020-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.1E-04 22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Respiratory tract tumors in hamsters                                                                                                                                                                                                                                                                                                                                                                     | Respiratory system                                                                                                                                                                                                                                                    |
| Dibenzo(a,h)anthracene   53-70-3   1.2E-03   22 CCR § 68400.5, 69020-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.2E-03   22 CCR § 68400.5, 69020-69022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Alveolar cell carcinoma in mice                                                                                                                                                                                                                                                                                                                                                                          | Respiratory system                                                                                                                                                                                                                                                    |

CCR = California Code of Regulations
IUR = Inhalation Unit Risk
IRIS = Integrated Risk Information System
OEHHA = California Office of Environmental Health Hazard Assessment

 $PAHs = polycyclic \ aromatic \ hydrocarbons \\ PPRTV = Provisional Peer-Reviewed \ Toxicity \ Values \\ (\mu g/m^3)^{-1} = risk \ per \ micrograms \ per \ cubic \ meter \ of \ air \\ -- = not \ available$ 

Table 7. Toxicity criteria for carcinogenic effects based on oral and dermal exposure

|                                                        |               |                         |                               | Cancer Endpoint                                 |                                  |
|--------------------------------------------------------|---------------|-------------------------|-------------------------------|-------------------------------------------------|----------------------------------|
|                                                        |               | SFO                     |                               |                                                 |                                  |
| Chemical                                               | CAS#          | (mg/kg-d) <sup>-1</sup> | Source                        | Toxicologic Endpoint                            | Target Organ(s)                  |
| Quantitatively Assessed Chemicals (analyzed chemicals) | ınalyzed chem | ricals)                 |                               |                                                 |                                  |
| Hexavalent chromium                                    | 18540-29-9    | 5.0E-01                 | 22 CCR § 68400.5, 69020-69022 | Tumors of the small intestine in mice           | Digestive system                 |
| Arsenic                                                | 7440-38-2     | 9.5E+00                 | 22 CCR § 68400.5, 69020-69022 | Lung and bladder cancer in humans               | Respiratory and urinary systems  |
| Lead                                                   | 7439-92-1     | 8.5E-03                 | OEHHA (2011a)                 | Kidney tumors in rats                           | Urinary system                   |
| Pentachlorophenol                                      | 87-86-5       | 4.0E-01                 | IRIS (USEPA, 2020b)           | Liver tumors and adrenal gland tumors in mice   | Digestive and endocrine systems  |
| Dioxins/Furans                                         |               |                         |                               |                                                 |                                  |
| 2,3,7,8-Tetrachlorodibenzo-p-dioxin                    | 1746-01-6     | 1.3E+05                 | OEHHA (2011a)                 | Liver tumors in mice                            | Digestive system                 |
| PCBs                                                   |               |                         |                               |                                                 |                                  |
| PCBs (Total)                                           | 1336-36-3     | 2.0E+00                 | IRIS (USEPA, 2020b)           | Liver tumors and bile duct tumors in rats       | Digestive system                 |
| PAHs                                                   |               |                         |                               |                                                 |                                  |
| Naphthalene                                            | 91-20-3       | 1.2E-01                 | OEHHA (2011a)                 | Nasal tumors and nasal olfactory tumors in rats | Respiratory and olfactory system |
| Benzo(a)anthracene                                     | 56-55-3       | 1.0E-01                 | USEPA (2020a)                 | Alimentary tract tumors in mice                 | Digestive system                 |
| Chrysene                                               | 218-01-9      | 1.0E-03                 | USEPA (2020a)                 | Alimentary tract tumors in mice                 | Digestive system                 |
| Benzo(b)fluoranthene                                   | 205-99-2      | 1.0E-01                 | USEPA (2020a)                 | Alimentary tract tumors in mice                 | Digestive system                 |
| Benzo(k)fluoranthene                                   | 207-08-9      | 1.0E-02                 | USEPA (2020a)                 | Alimentary tract tumors in mice                 | Digestive system                 |
| Benzo(a)pyrene                                         | 50-32-8       | 1.0E+00                 | IRIS (USEPA, 2020b)           | Alimentary tract tumors in mice                 | Digestive system                 |
| Indeno(1,2,3-cd)pyrene                                 | 193-39-5      | 1.0E-01                 | USEPA (2020a)                 | Alimentary tract tumors in mice                 | Digestive system                 |
| Dibenzo(a,h)anthracene                                 | 53-70-3       | 4.1E+00                 | 22 CCR § 68400.5, 69020-69022 | Alveolar cell carcinoma in mice                 | Respiratory system               |
|                                                        |               |                         |                               |                                                 |                                  |

# Abbreviations

CAS # = Chemical Abstracts Service Registry Number

CCR = California Code of Regulations IRIS = Integrated Risk Information System

 $(mgkg-d)^{-1} = per$  (milligram per kilogram-day) OEHHA = Office of Environmental Health Hazard Assessment

 $PAHs = polycyclic aromatic hydrocarbons \\ PCBs = polychlorinated biphenyls \\ SFO = oral slope factor \\ USEPA = United States Environmental Protection Agency \\$ 

Table 8. Summary of estimated risks by location/SEG

|                                         |            | Dermal     | Incidental   |            |
|-----------------------------------------|------------|------------|--------------|------------|
| Location                                | Inhalation | Contact    | Ingestion    | Total Risk |
| Primary Scenarios                       |            | Cancer Ris | k per 10,000 |            |
| Air Operations - intermediate and       |            |            |              |            |
| heavy maintenance on aircraft           | 20         | 0.01       | 0.02         | 20         |
| Breathing Apparatus Shop - small        |            |            |              |            |
| engine repair shop - repair and tune-up |            |            |              |            |
| of power equipment                      | 30         |            |              | 30         |
| Eastern Fire Shop - maintenance/ repair |            |            |              |            |
| on fire apparatus                       | 400        | 0.001      | 0.02         | 400        |
| Additional Scenarios                    |            |            |              |            |
| Air Operations - Mastinox contact only  |            | 0.2        | 0.2          | 0.3        |
| Eastern Fire Shop - Welding/ grinding/  |            |            |              |            |
| cutting activities only                 | 0.02       |            |              | 0.02       |
| Breathing Apparatus Shop - air pack     |            |            |              |            |
| repair                                  |            | 0.04       | 0.2          | 0.2        |
| Breathing Apparatus Shop - fire hose    |            |            |              |            |
| repair shop - fire hose repair          |            | 0.00009    | 0.0009       | 0.001      |

### <u>Notes</u>

Risks exceeding 1 in 10,000 (1E-04).

### **Abbreviations**

SEG - similar exposure group

Table 9. Sensitivity analysis of potential inhalation risk estimates

Risk calculations based on detected concentrations of chemicals of potential concern (COPCs)<sup>1</sup>

| Location/Specialized task                        |                      | Benzene            |       | Te                   | Tetrachloroethylene | 16    | Hex                  | Hexavalent Chromium | ım                 |
|--------------------------------------------------|----------------------|--------------------|-------|----------------------|---------------------|-------|----------------------|---------------------|--------------------|
|                                                  | Cal/EPA <sup>2</sup> | USEPA <sup>3</sup> | HSOIN | Cal/EPA <sup>2</sup> | USEPA <sup>3</sup>  | NIOSH | Cal/EPA <sup>2</sup> | USEPA <sup>3</sup>  | NIOSH <sup>4</sup> |
| Inhalation Unit Risk (IUR) (μg/m³) <sup>-1</sup> | 0.000029             | 0.000008           | NA    | 0.0000061            | 0.00000026          | NA    | 0.15                 | 0.012               | 0.006              |
| Air Operations                                   | 1                    | 1                  | 1     |                      | -                   |       | 2.3E-03              | 1.9E-04             | 5.0E-04            |
| Breathing Apparatus Shop                         | 3.0E-03              | 8.2E-04            | NA    |                      |                     | -     | -                    |                     | +                  |
| Eastern Fire Shop                                | -                    | -                  |       | 3.5E-02              | 1.5E-03             | NA    |                      |                     | -                  |

Cancer Risk = Ca/PF \* ET \* EF \* ED \* IUR

| Description                                             | Parameter | Units             | Value              |
|---------------------------------------------------------|-----------|-------------------|--------------------|
|                                                         |           |                   | Chemical-specific/ |
| Concentration in Air                                    | Ca        | μg/m³             | measured           |
| Inhalation unit risk                                    | IUR       | (µg/m³)-1         | Chemical-specific  |
| Respirator protection factor (welding only)             | PF        | ()                | 10                 |
| Exposure time (Air Operations_fraction)                 | ET_AO_f   | 9 hours/24 hours  | 0.38               |
| Exposure time (Eastern Fire Shop_fraction)              | ET_FS_f   | 9 hours/24 hours  | 0.38               |
| Exposure time                                           | ET        | 8 hours/24 hours  | 0.33               |
| Exposure frequency 1 (Air Operations)                   | EF_1      | 280 days/365 days | 77.0               |
| Exposure frequency 2 (Breathing Apparatus Shop)         | EF_2      | 262 days/365 days | 0.72               |
| Exposure frequency 3 (Eastern Fire Shop)                | EF_3      | 247 days/365 days | 89.0               |
| Exposure frequency 4 (welding at the Eastern Fire Shop) | EF_4      | 12 days/365       | 0.033              |
| Exposure duration                                       | ED        | 45 years/70 years | 0.64               |

- 1. Risk calculation based on maximum detected concentration in air (Ca).
- 2. DTSC HERO. 2019. Human Health Risk Assessment (HHRA) Note Number 10, Toxicity Criteria. Accessed at https://dtsc.ca.gov/human-health-risk-hero/.
- 3. USEPA. 2020. Regional Screening Levels (RSLs) Generic Tables. As of November 2020. Accessed at https://www.epa.gov/risk/regional-screening-levels-rals-generic-tables. 4. NIOSH. 2013. Criteria for a Recommended Standard Occupational Exposure to Hexavalent Chromium, DHHS (NIOSH) Publication No. 2013-128, September.

<u>Abbreviations</u>
Cal/EPA = California Environmental Protection Agency (DTSC)

COPC = chemical of potential concern

USEPA = US Environmental Protection Agency

-- = chemical not measured IUR = inhalation unit risk

NA = not available or not applicable

NIOSH = National Institute for Occupational Safety and Health

Chemical of potential concern (COPC) not measured and not relevant to this location.

Red shading indicates risks greater than 1 in 10,000 (1E-04)

### **ATTACHMENT 1**

# Summary of Personal Breathing-Zone and Surface Wipe Samples at Air Operations

Attachment 1-A. Personal breathing-zone samples at Air Operations - hexavalent chromium

| nexavaient c |                                              |                | Sample          |                          | Hexavalent    |
|--------------|----------------------------------------------|----------------|-----------------|--------------------------|---------------|
| Sampling     |                                              |                | <b>Duration</b> | Air Volume               | Chromium      |
| Date         | Job Task                                     | Sample ID      | (minutes)       | (Liters)                 | $(\mu g/m^3)$ |
| 11/3/20      | Intermediate & heavy maintenance on aircraft | HM-1103-<br>01 | 438             | 876                      | <0.068        |
| 11/3/20      | Intermediate & heavy maintenance on aircraft | HM-1103-<br>02 | 465             | 930                      | <0.065        |
| 11/3/20      | Intermediate & heavy maintenance on aircraft | HM-1103-<br>04 | 454             | 908                      | <0.066        |
| 11/3/20      | Intermediate & heavy maintenance on aircraft | HM-1103-<br>08 | 426             | 852                      | <0.070        |
| 11/3/20      | Intermediate & heavy maintenance on aircraft | HM-1103-<br>11 | 416             | 832                      | <0.072        |
| 11/3/20      | Heavy<br>maintenance<br>on aircraft          | HM-1103-<br>10 | 385             | 770                      | <0.078        |
| 11/3/20      | Heavy<br>maintenance<br>on aircraft          | HM-1103-<br>12 | 314             | 628                      | <0.096        |
| 11/3/20      | Heavy<br>maintenance<br>on aircraft          | HM-1103-<br>13 | 372             | 744                      | 0.084         |
|              | EP                                           | C - Intermed   | iate & heavy    | maintenance <sup>1</sup> | < 0.072       |
|              |                                              |                | EPC - Heavy     | maintenance <sup>1</sup> | 0.084         |

### **Notes**

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### **Abbreviations**

EPC = exposure point concentration  $\mu g/m^3 = micrograms$  per cubic meter **Bold** indicates detected result. Shaded represents the EPC

Attachment 1-B. Personal breathing zone samples at Air Operations - respirable crystalline silica

| Sampling<br>Date | Job Task                            | Sample ID    | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | Quartz<br>(μg/m³) | Cristobalite<br>(μg/m³) | Tridymite (μg/m³) |
|------------------|-------------------------------------|--------------|---------------------------------|---------------------------|-------------------|-------------------------|-------------------|
| 11/3/20          | Heavy<br>maintenance<br>on aircraft | 40203        | 422                             | 1,055                     | <4.7              | <4.7                    | <19               |
| 11/3/20          | Heavy<br>maintenance<br>on aircraft | 40204        | 417                             | 1,042.50                  | <4.8              | <4.8                    | <19               |
| 11/3/20          | Heavy<br>maintenance<br>on aircraft | 40174        | 393                             | 982.5                     | <5.1              | <5.1                    | <20               |
| 11/3/20          | Heavy<br>maintenance<br>on aircraft | 40173        | 379*                            | 947.5                     | <5.3              | <5.3                    | <21               |
| 11/3/20          | Heavy<br>maintenance<br>on aircraft | 40193        | 314                             | 785                       | <6.4              | <6.4                    | <25               |
| 11/3/20          | Heavy<br>maintenance<br>on aircraft | 40163        | 374                             | 935                       | <5.3              | <5.3                    | <21               |
|                  |                                     | Exposure Poi | nt Concentra                    | ation (EPC) <sup>1</sup>  | <6.4              | <6.4                    | <25               |

### Notes

Sample duration is based on an estimated sample end time of 2:30pm. The results may be biased high, but the results were non-detect.

### **Abbreviations**

 $\mu$ g/m<sup>3</sup> = micrograms per cubic meter Shaded represents the EPC

<sup>1.</sup> For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

<sup>\*</sup> Sample duration is uncertain; personal sampling air pump faulted between the times of 1:30pm and 3:15pm.

Attachment 1-C. Personal breathing zone samples at Air Operations - volatile organic compounds

|                  | 1-C. Personal bro                          |           | Sample                                   | Benzene              | Ethylbenzene         | Naph-<br>thalene     |
|------------------|--------------------------------------------|-----------|------------------------------------------|----------------------|----------------------|----------------------|
| Sampling<br>Date | Job Task                                   | Sample ID | Duration<br>(minutes)                    | (mg/m <sup>3</sup> ) | (mg/m <sup>3</sup> ) | (mg/m <sup>3</sup> ) |
| 11/3/20          | Intermediate<br>maintenance on<br>aircraft | EL0042    | 546                                      | <0.052               | <0.67                | <0.74                |
| 11/3/20          | Intermediate<br>maintenance on<br>aircraft | EL0122    | 547                                      | <0.051               | <0.67                | <0.74                |
| 11/3/20          | Intermediate<br>maintenance on<br>aircraft | EL0053    | 547                                      | <0.051               | <0.67                | <0.74                |
| 11/3/20          | Intermediate<br>maintenance on<br>aircraft | EL0089    | 542                                      | <0.052               | <0.68                | <0.75                |
| 11/3/20          | Intermediate<br>maintenance on<br>aircraft | EL0134    | 467                                      | <0.060               | <0.78                | <0.87                |
| 11/3/20          | Intermediate<br>maintenance on<br>aircraft | EL0146    | 461                                      | <0.061               | <0.79                | <0.88                |
| 11/3/20          | General work in<br>Hangar                  | EL0086    | 487                                      | <0.058               | <0.75                | <0.83                |
| 11/3/20          | General work in<br>Hangar                  | EL0132    | 486                                      | <0.058               | <0.75                | <0.84                |
| Exposi           | ure Point Concent                          | , ,       | - Intermediate<br>nance (mg/m³)¹         | < 0.061              | < 0.79               | < 0.88               |
|                  | EPC - Gener                                |           | angar (mg/m <sup>3</sup> ) <sup>1</sup>  | <0.058               | < 0.75               | < 0.84               |
|                  |                                            |           | enance $(\mu g/m^3)^2$                   | <61                  | <790                 | <880                 |
|                  |                                            |           | langar (μg/m <sup>3</sup> ) <sup>2</sup> | <58                  | <750                 | <840                 |

### Notes

2. The units were converted from  $mg/m^3$  to  $\mu g/m^3$ .

### **Abbreviations**

 $mg/m^3 = milligrams$  per cubic meter  $\mu g/m^3 = micrograms$  per cubic meter Shaded represents the EPC

<sup>1.</sup> For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

Attachment 1-D-1. Surface Wipe Samples at Air Operations - arsenic and lead in units of μg/cm<sup>2</sup>

| Sampling | 1-D-1. Surface Wipe                                   | <br>                                                        |                              |         |         |
|----------|-------------------------------------------------------|-------------------------------------------------------------|------------------------------|---------|---------|
| Date     | Sampling Location                                     | Observations / Notes                                        | Sample ID                    | Arsenic | Lead    |
| 11/3/20  | Intermediate gear box of Firehawk                     | Fire residues/ dust                                         | N190LA-01-A                  | < 0.063 | 0.019   |
| 11/3/20  | Right stabilator of<br>Bell412                        | Fire residues/ dust                                         | N14LA-03-A                   | <0.063  | 0.033   |
| 11/3/20  | Right tailbone of<br>Bell412                          | Fire residues/ dust                                         | N14LA-02-A                   | < 0.063 | 0.023   |
| 11/3/20  | Right side of nose of<br>Bell412                      | Fire residues/ dust                                         | N14LA-01-A                   | < 0.063 | 0.028   |
| 11/3/20  | Upper aft blade<br>antenna, left side, of<br>Firehawk | Fire residues/ dust                                         | N190LA-02-A                  | <0.063  | <0.0050 |
| 11/3/20  | Transition access<br>door, underside, of<br>Firehawk  | Fire residues/ dust                                         | N190LA-03-A                  | < 0.063 | 0.023   |
| 11/3/20  | Right engine exhaust cowling of Firehawk              | Firehawk had been to<br>a recent wildfire<br>(October 2020) | N822LA-01-A                  | < 0.063 | <0.0050 |
| 11/3/20  | Tail of Bell412                                       | Bell412 had not been<br>cleaned since usage in<br>wildfire  | N120LA-01-A                  | <0.063  | 0.0082  |
| 11/3/20  | Blade antenna of<br>Bell412                           | Bell412 had not been<br>cleaned since usage in<br>wildfire  | N120LA-02-A                  | <0.063  | 0.016   |
| 11/3/20  | Horizontal stabilator<br>of Firehawk                  | Firehawk had been to<br>a recent wildfire<br>(October 2020) | N822LA-03-A                  | <0.063  | 0.0091  |
| 11/3/20  | Forward cowling,<br>right side, of<br>Firehawk        | Firehawk had been to<br>a recent wildfire<br>(October 2020) | N822LA-02-A                  | <0.063  | 0.0085  |
| 11/3/20  | Glass "sun<br>roof"/"greenhouse"<br>of Bell412        | Bell412 had not been<br>cleaned since usage in<br>wildfire  | N120LA-03-A                  | < 0.063 | 0.016   |
|          |                                                       | Exposure Point Conce                                        | entration (EPC) <sup>1</sup> | < 0.063 | 0.016   |

Attachment 1-D-2. Surface Wipe Samples at Air Operations - hexavalent chromium (Cr[VI]) in units of  $\mu g/cm^2$ 

| Sampling |                                                          |                      |                              |         |
|----------|----------------------------------------------------------|----------------------|------------------------------|---------|
| Date     | Sampling Location                                        | Observations / Notes | Sample ID                    | Cr(VI)  |
| 11/3/20  | Hot part of left engine<br>(seam) of Bell412             |                      | N18LA-01                     | 0.0014  |
| 11/3/20  | Hot part of left engine (seam) of Bell412                |                      | N17LA-04                     | 0.00076 |
| 11/3/20  | Hot part of right<br>engine (seam) of<br>Bell412         |                      | N18LA-02                     | 0.0022  |
| 11/3/20  | Hot part of right<br>engine (seam) of<br>Bell412         |                      | N120LA-01                    | 0.0019  |
| 11/3/20  | Hot part of left engine (seam) of Bell412                |                      | N120LA-02                    | 0.0013  |
| 11/3/20  | Hot part of left engine<br>(seam) of Bell412             |                      | N17LA-03                     | 0.0011  |
|          |                                                          | Exposure Point Conce | entration (EPC) <sup>1</sup> | 0.0014  |
| 11/3/20  | Skid on right side of<br>Bell412                         | Mastinox visible     | N14LA-05                     | 0.080   |
| 11/3/20  | Mating surface of combining gear box trimount of Bell412 | Mastinox visible     | N14LA-06                     | 0.54    |
|          |                                                          |                      | EPC <sup>1</sup>             | 0.54    |

### Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### Abbreviations

μg/cm<sup>2</sup> = micrograms per square centimeter Shaded represents the EPC

**Bold** indicates detected result.

 $Attachment \ 1-D-3. \ Surface \ Wipe \ Samples \ at \ Air \ Operations - polycyclic \ aromatic \ hydrocarbons \ (PAHs) \ in \ units \ of \ \mu g/cm^2$ 

| Sample ID | Sampling<br>Location                                  | Naphthalene | Benzo(a)-<br>anthracene | Chrysene | Benzo(b)-<br>fluoranthene | Benzo(k)-<br>fluoranthene | Benzo(a)- | Indeno(1,2,3<br>-cd)pyrene | Dibenzo(a,h)-<br>anthracene |
|-----------|-------------------------------------------------------|-------------|-------------------------|----------|---------------------------|---------------------------|-----------|----------------------------|-----------------------------|
| Sample 1D | Location                                              | Naphthalene | anthracene              | Chrysene | nuorantnene               | пиогапинене               | pyrene    | -cu)pyrene                 | anthracene                  |
| N190LA-01 | Intermediate gear<br>box of Firehawk                  | <0.0050     | < 0.0050                | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N14LA-03  | Right stabilator of<br>Bell412                        | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N14LA-02  | Right tailbone of<br>Bell412                          | <0.0050     | < 0.0050                | <0.0050  | <0.0050                   | < 0.0050                  | < 0.0050  | <0.0050                    | <0.0050                     |
| N14LA-01  | Right side of nose<br>of Bell412                      | <0.0050     | < 0.0050                | <0.0050  | <0.0050                   | < 0.0050                  | < 0.0050  | <0.0050                    | <0.0050                     |
| N190LA-02 | Upper aft blade<br>antenna, left side,<br>of Firehawk | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N190LA-03 | Transition access<br>door, underside,<br>of Firehawk  | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N822LA-01 | Right engine<br>exhaust cowling<br>of Firehawk        | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N120LA-01 | Tail of Bell412                                       | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N120LA-02 | Blade antenna of<br>Bell412                           | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N822LA-03 | Horizontal<br>stabilator of<br>Firehawk               | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N822LA-02 | Forward cowling,<br>right side, of<br>Firehawk        | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
| N120LA-03 | Glass "sun<br>roof"/"greenhouse"<br>of Bell412        | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050   | <0.0050                    | <0.0050                     |
|           | EPC <sup>1</sup>                                      | < 0.0050    | < 0.0050                | < 0.0050 | < 0.0050                  | < 0.0050                  | < 0.0050  | < 0.0050                   | < 0.0050                    |

Attachment 1-D-4. Surface Wipe Samples at Air Operations - PCBs and Dioxin/Furans in units of µg/cm2

| Sampling<br>Date | Sampling<br>Location                   | Sample ID        | PCB TEQ | Non-TEQ<br>PCB | Dioxin/<br>Furan TEQ |
|------------------|----------------------------------------|------------------|---------|----------------|----------------------|
| 11/3/20          | Horizontal<br>stabilator of<br>Bell412 | 356-4            | 8.6E-10 | 2.9E-06        | 1.3E-08              |
| 11/3/20          | Chin bubble of<br>Bell412              | 356-5            | 1.2E-09 | 2.9E-06        | 1.5E-08              |
|                  |                                        | EPC <sup>1</sup> | 1.2E-09 | 2.9E-06        | 1.5E-08              |

### Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### Abbreviations

 $\mu g/cm^2 = micrograms \ per \ square \ centimeter$ 

Shaded represents the EPC

PCBs = polychlorinated biphenyls TEQ = toxic equivalence

Bold indicates detected result.

### **ATTACHMENT 2**

# Summary of Personal Breathing-Zone and Surface Wipe Samples at the Breathing Apparatus Shop

Attachment 2-A. Personal breathing-zone samples at the Small Engine Repair Shop - volatile organic compounds

| Sampling<br>Date | Job Task                                                          | Sample ID     | Sample<br>Duration<br>(minutes)      | Ethyl-<br>benzene<br>(mg/m³) | Naph-<br>thalene<br>(mg/m³) | Styrene<br>(mg/m³) | Benzene<br>(mg/m³) | Sample ID                             | Acetalde-<br>hyde<br>(mg/m³) | Formalde-<br>hyde<br>(mg/m³) |
|------------------|-------------------------------------------------------------------|---------------|--------------------------------------|------------------------------|-----------------------------|--------------------|--------------------|---------------------------------------|------------------------------|------------------------------|
| 11/3/20          | Small engine<br>repair shop<br>equipment<br>maintenance<br>worker | EL0064        | 349                                  | <1.0                         | <1.2                        | <0.99              | 0.68               | A295581                               | 0.027                        | 0.026                        |
| 11/3/20          | Small engine<br>repair shop<br>equipment<br>maintenance<br>worker | EL0139        | 349                                  | <1.0                         | <1.2                        | <0.99              | 0.30               | A295575                               | 0.027                        | 0.028                        |
| Expos            | ure point conc                                                    | entration (EF | C) (mg/m <sup>3</sup> ) <sup>1</sup> | <1.0                         | <1.2                        | < 0.99             | 0.68               | EPC (mg/m <sup>3</sup> ) <sup>1</sup> | 0.027                        | 0.028                        |
|                  |                                                                   | F             | $PC (\mu g/m^3)^2$                   | <1000                        | <1,200                      | <990               | 680                | EPC $(\mu g/m^3)^2$                   | 27                           | 28                           |

### Notes

- 1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.
- 2. The units were converted from  $mg/m^3$  to  $\mu g/m^3.$

### Abbreviations

mg/m³ = milligrams per cubic meter μg/m³ = micrograms per cubic meter Shaded represents the EPC Bold indicates detected result.

Attachment 2-B-1. Surface Wipe Samples at the Breathing Apparatus Shop - arsenic, lead, and

pentachlorophenol in units of  $\mu g/cm^2$ 

| Sampling<br>Date | Sample ID              | Sampling<br>Location                     | Observations/<br>Notes       | Arsenic | Lead  | Pentachloro-<br>phenol |
|------------------|------------------------|------------------------------------------|------------------------------|---------|-------|------------------------|
| 11/3/20          | ЕСТС-Т-8-А             | Where pump<br>sits, southern<br>location | Training air<br>pack         | < 0.063 | 0.017 |                        |
| 11/3/20          | ECTC-T-38-A            | Where pump<br>sits, southern<br>location | Training air<br>pack         | <0.063  | 0.016 |                        |
| 11/3/20          | A49996-QUT-<br>185-4-A | Where pump<br>sits, southern<br>location | Field air pack               | <0.063  | 0.014 |                        |
| 11/3/20          | A50143-Q-24-<br>5-A    | Where pump<br>sits, southern<br>location | Field air pack               | <0.063  | 0.013 |                        |
| 11/3/20          | NC5O-4-A               | Where pump<br>sits, southern<br>location | Training air<br>pack         | <0.063  | 0.027 |                        |
| 11/3/20          | AS0421-ENG-<br>21-4-A  | Where pump<br>sits, southern<br>location | Field air pack               | <0.063  | 0.048 |                        |
| 11/3/20          | A50143-Q-24-<br>5      | Where pump<br>sits, middle<br>portion    | Field air pack               |         |       | <0.0050                |
| 11/3/20          | ECTC-T-7               | Where pump<br>sits, middle<br>portion    | Training air<br>pack         |         |       | <0.0050                |
|                  | Expo                   | sure Point Conce                         | entration (EPC) <sup>1</sup> | < 0.063 | 0.023 | < 0.0050               |

Attachment 2-B-2. Surface Wipe Samples at the Breathing Apparatus

Shop - PCBs and Dioxin/Furans in units of µg/cm<sup>2</sup>

|           | s and Dioxin/Fu                       |         | 8/             |                      |
|-----------|---------------------------------------|---------|----------------|----------------------|
| Sample ID | Sampling<br>Location                  | PCB TEQ | Non-TEQ<br>PCB | Dioxin/<br>Furan TEQ |
| BA-1      | Where pump<br>sits, middle<br>portion | 1.1E-09 | 2.1E-05        | 1.7E-08              |
| BA-2      | Where pump<br>sits, middle<br>portion | 1.8E-09 | 1.7E-05        | 3.0E-08              |
|           | EPC <sup>1</sup>                      | 1.8E-09 | 2.1E-05        | 3.0E-08              |

### Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### Abbreviations

μg/cm² = micrograms per square centimeter Shaded represents the EPC Bold indicates detected result. PCBs = polychlorinated biphenyls TEQ = toxic equivalence Attachment 2-B-3. Surface Wipe Samples at the Breathing Apparatus Shop - polycyclic aromatic hydrocarbons (PAHs) in units of µg/cm²

| Sample ID           | Sampling<br>Location                         | Observations/<br>Notes       | Naphthalene | Benzo(a)-<br>anthracene | Chrysene | Benzo(b)-<br>fluoranthene | Benzo(k)-<br>fluoranthene | Benzo(a)-<br>pyrene | Indeno(1,2,3<br>-cd)pyrene | Dibenzo(a,h)-<br>anthracene |
|---------------------|----------------------------------------------|------------------------------|-------------|-------------------------|----------|---------------------------|---------------------------|---------------------|----------------------------|-----------------------------|
| A49996              | Where air pump<br>sits, northern<br>location | Field air pack               | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| A50421 ENG-<br>21-4 | Where air pump<br>sits, northern<br>location | Field air pack               | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | < 0.0050            | <0.0050                    | <0.0050                     |
| A5014 Q-24-5        | Where air pump<br>sits, northern<br>location | Field air pack               | <0.0050     | <0.0050                 | <0.0050  | <0.0050                   | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| ЕСТС-Т-8            | Where air pump<br>sits, northern<br>location | Training air pack            | 0.018       | 0.048                   | 0.050    | 0.10                      | <0.0050                   | 0.045               | 0.035                      | 0.0071                      |
| ECTC-T-38           | Where air pump<br>sits, northern<br>location | Training air pack            | < 0.0050    | 0.0098                  | 0.013    | 0.020                     | 0.0070                    | 0.0083              | 0.0091                     | <0.0050                     |
| NCSO-04             | Where air pump<br>sits, northern<br>location | Training air<br>pack         | <0.0050     | 0.034                   | 0.035    | 0.048                     | 0.016                     | 0.030               | 0.020                      | <0.0050                     |
| Exp                 | osure Point Conce                            | entration (EPC) <sup>1</sup> | 0.0051      | 0.017                   | 0.018    | 0.029                     | 0.0055                    | 0.015               | 0.012                      | 0.0033                      |

### Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### Abbreviations

μg/cm<sup>2</sup> = micrograms per square centimeter **Bold** indicates detected result.

Shaded represents the EPC

Attachment 2-C-1. Surface Wipe Samples of Fire Hoses - arsenic and lead in units of

µg/cm<sup>2</sup>

| Sampling |                    | Sampling         | Observations/                                   |         |             |
|----------|--------------------|------------------|-------------------------------------------------|---------|-------------|
| Date     | Sample ID Location | Location         | Notes                                           | Arsenic | <b>Lead</b> |
| 11/3/20  | 11/3/20 H-01-A     | Exterior of hose | Fire Hose                                       | <0.063  | 0.0088      |
| 11/3/20  | 11/3/20 H-02-A     | Exterior of hose | Fire Hose                                       | <0.063  | 0.0095      |
| 11/3/20  | 11/3/20 H-03-A     | Exterior of hose | Fire Hose                                       | <0.063  | 92000       |
| 11/3/20  | 11/3/20 H-04-A     | Exterior of hose | Fire Hose                                       | <0.063  | 0.025       |
| 11/3/20  | 11/3/20 H-05-A     | Exterior of hose | Fire Hose                                       | <0.063  | 0.13        |
| 11/3/20  | 11/3/20 H-06-A     | Exterior of hose | Fire Hose                                       | <0.063  | 0.056       |
|          | Exposu             | ire Point Con    | Exposure Point Concentration (EPC) <sup>1</sup> | <0.063  | 0.039       |

## Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

# **Abbreviations**

 $\mu g/cm^2 = micrograms per square centimeter$ 

Shaded represents the EPC

**Bold** indicates detected result.

Attachment 2-C-2. Surface Wipe Samples of Fire Hoses - polycyclic aromatic hydrocarbons (PAHs) in units of µg/cm<sup>2</sup>

|                 |                       |             |            |          |              |              | 6.1       |                              |               |
|-----------------|-----------------------|-------------|------------|----------|--------------|--------------|-----------|------------------------------|---------------|
|                 | Observations/         |             | Benzo(a)-  |          | Benzo(b)-    | Benzo(k)-    | Benzo(a)- | Indeno(1,2,3   Dibenzo(a,h)- | Dibenzo(a,h)- |
| Sample ID Notes | Notes                 | Naphthalene | anthracene | Chrysene | fluoranthene | fluoranthene | pyrene    | -cd)pyrene                   | anthracene    |
| H-01            | Fire hose, very dirty | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
| H-02            | Fire hose             | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
| Н-03            | Fire hose             | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
| H-04            | Fire hose, very dirty | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
| Н-05            | Fire hose, very dirty | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
| 90-H            | Fire hose             | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
|                 | EPC <sup>1</sup>      | <0.0050     | <0.0050    | <0.0050  | <0.0050      | <0.0050      | <0.0050   | <0.0050                      | <0.0050       |
|                 |                       |             |            |          |              |              |           |                              |               |

## Notes

limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the 1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection maximum detected value, or (2) the maximum detection limit.

# Abbreviations

EPC = exposure point concentration μg/cm<sup>2</sup> = micrograms per square centimeter Shaded represents the EPC

Bold indicates detected result.

### **ATTACHMENT 3**

# Summary of Personal Breathing-Zone and Surface Wipe Samples at the Eastern Fire Shop

Attachment 3-A. Personal breathing-zone and area samples at the Eastern Fire Shop - volatile organic compounds and

diesel particulate as elemental carbon

|                                                          | diate as elem                                                |               |                                       |            | E4L L                | N. I                 |           | D: 1 (: 1)                      |
|----------------------------------------------------------|--------------------------------------------------------------|---------------|---------------------------------------|------------|----------------------|----------------------|-----------|---------------------------------|
| Sampling                                                 |                                                              |               | Sample<br>Duration                    | Benzene    | Ethyl-<br>benzene    | Naph-<br>thalene     |           | Diesel particulate as elemental |
| Date                                                     | Job Task                                                     | Sample ID     | (minutes)                             | $(mg/m^3)$ | (mg/m <sup>3</sup> ) | (mg/m <sup>3</sup> ) | Sample ID | carbon (μg/m³)                  |
| 11/4/20                                                  | Maintenance<br>on fire<br>apparatus                          | EL0128        | 422                                   | <0.067     | <0.87                | <0.96                | 11401     | <2.4                            |
| 11/4/20                                                  | Maintenance<br>on fire<br>apparatus                          | EL0110        | 433                                   | <0.065     | <0.85                | <0.94                | 11402     | <2.2                            |
| 11/4/20                                                  | Maintenance on fire apparatus                                | EL0102        | 440                                   | <0.064     | <0.83                | <0.92                | 11403     | <2.2                            |
| 11/4/20                                                  | Maintenance on fire apparatus                                | EL0135        | 436                                   | < 0.065    | <0.84                | < 0.93               | 11404     | <2.2                            |
| 11/4/20                                                  | Maintenance on fire apparatus                                | EL0129        | 427                                   | <0.066     | <0.86                | <0.95                | 11405     | 180                             |
| 11/4/20                                                  | Maintenance<br>on fire<br>apparatus                          | EL0107        | 396                                   | <0.071     | <0.93                | <1.0                 | 11406     | <2.5                            |
| 11/4/20                                                  | General<br>work in<br>Eastern Fire<br>Shop                   | EL0232        | 430                                   | <0.066     | <0.85                | <0.95                | 11407     | <2.1                            |
| 11/4/20                                                  | General<br>work in<br>Eastern Fire<br>Shop                   | EL0060        | 427                                   | <0.066     | <0.86                | <0.95                | 11408     | <2.1                            |
| EPC - Maintenance on fire apparatus (mg/m³) <sup>1</sup> |                                                              |               | < 0.071                               | < 0.93     | <1.0                 |                      |           |                                 |
| EPC - Mai                                                | EPC - Maintenance on fire apparatus (µg/m³) <sup>1,2,3</sup> |               |                                       |            | <930                 | <1000                |           | <2.5                            |
| EPC                                                      | C - General wo                                               | ork in Easter | n Fire Shop<br>(mg/m³)¹               | <0.066     | < 0.86               | <0.95                |           |                                 |
| EPC                                                      | C - General wo                                               | ork in Easter | n Fire Shop<br>(μg/m³) <sup>1,2</sup> | <66        | <860                 | <950                 |           | <2.1                            |

- 1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.
- 2. The units were converted from mg/m³ to μg/m³.
- 3. Diesel particulate as elemental carbon measured in Sample EL0129 was determined to be an outlier and removed from the dataset.

### Abbreviations

EPC = exposure point concentration mg/m<sup>3</sup> = milligrams per cubic meter  $\mu g/m^3 = micrograms per cubic meter$ **Bold** indicates detected result.

Shaded represents the EPC

-- = not applicable

Attachment 3-B. Personal breathing-zone samples at the Fire Shop - tetrachloroethylene

| Sampling<br>Date | Job Task                            | Sample ID    | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(liters)  | Tetrachloro-<br>ethylene<br>(mg/m³) |
|------------------|-------------------------------------|--------------|---------------------------------|----------------------------|-------------------------------------|
| 11/4/20          | Maintenance<br>on fire<br>apparatus | 72773        | 310                             | 38.44                      | 67                                  |
| 11/4/20          | Maintenance<br>on fire<br>apparatus | 72775        | 331                             | 42.2                       | 16*                                 |
| 11/4/20          | Maintenance on fire apparatus       | 72776        | 332                             | 49.3                       | 12                                  |
| 11/4/20          | Maintenance on fire apparatus       | 72780        | 298                             | 45.3                       | 17**                                |
| 11/4/20          | Maintenance<br>on fire<br>apparatus | 72781        | 306                             | 47.58                      | 27                                  |
| 11/4/20          | Maintenance<br>on fire<br>apparatus | 72779        | 298                             | 38.59                      | 75***                               |
|                  | Exposu                              | re Point Con | centration (EF                  |                            | 36                                  |
|                  |                                     |              | E                               | $^{2}PC (\mu g/m^{3})^{2}$ | 35,667                              |

### <u>Notes</u>

- 1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.
- 2. The units were converted from  $mg/m^3$  to  $\mu g/m^3.$
- \* The pre- and post- flow rate was different by approximately 11%; therefore, this result is an estimate (the true result is between 15 and 17 mg/m<sup>3</sup>).
- \*\* The pre- and post- flow rate was different by approximately 8%; therefore, this result is an estimate (the true result is between 17 and 18 mg/m<sup>3</sup>).
- \*\*\* The pre- and post- flow rate was different by approximately 28%; therefore, this result is an estimate (the true result is between 64 and 90 mg/m³).

### **Abbreviations**

 $mg/m^3 = milligrams$  per cubic meter  $\mu g/m^3 = micrograms$  per cubic meter **Bold** indicates detected result.

Attachment 3-C. Personal breathing-zone samples at the Fire Shop - welding-fume metals

| Sampling<br>Date | Job Task                            | Sample ID     | Sample<br>Duration<br>(minutes) | Arsenic<br>(μg/m³) | Beryllium<br>(μg/m³) | Cadmium (μg/m³) | Cobalt<br>(μg/m³) | Lead<br>(μg/m³) | Nickel<br>(μg/m³) |
|------------------|-------------------------------------|---------------|---------------------------------|--------------------|----------------------|-----------------|-------------------|-----------------|-------------------|
| 11/4/20          | Maintenance<br>on fire<br>apparatus | MET01         | 391                             | <3.2               | <0.016               | <0.096          | 0.18              | <0.64           | 1.9               |
| 11/4/20          | Maintenance<br>on fire<br>apparatus | MET02         | 294                             | <4.3               | <0.021               | <0.13           | <0.13             | <0.85           | 0.52              |
| Exposur          | e Point Conc                        | entration (El | PC) $(\mu g/m^3)^1$             | <4.3               | < 0.021              | < 0.13          | 0.18              | < 0.85          | 1.9               |

### <u>Notes</u>

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### Abbreviations

 $\mu g/m^3 = micrograms per cubic meter$ 

**Bold** indicates detected result.

Shaded represents the EPC

Attachment 3-D. Personal breathing-zone samples at the Fire Shop - hexavalent chromium in welding fumes

| Sampling<br>Date | Job Task                            | Sample ID    | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | Hexavalent chromium (µg/m³) |
|------------------|-------------------------------------|--------------|---------------------------------|---------------------------|-----------------------------|
| 11/4/20          | Maintenance<br>on fire<br>apparatus | FM002        | 389                             | 778                       | <0.077                      |
| 11/4/20          | Maintenance<br>on fire<br>apparatus | FM001        | 293                             | 586                       | <0.10                       |
|                  | Exposu                              | e Point Conc | entration (E                    | PC) $(\mu g/m^3)^1$       | < 0.10                      |

### <u>Notes</u>

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

### **Abbreviations**

 $\mu g/m^3$  = micrograms per cubic meter Shaded represents the EPC Attachment 3-E. Personal breathing-zone samples at the Fire Shop - N,N-dimethyl-para-toluidine

| Sampling<br>Date | Job Task                            | Sample ID    | Sample<br>Duration<br>(minutes) | Air<br>Volume<br>(Liters) | N,N-Dimethyl-Para-<br>Toluidine (µg/m³) |
|------------------|-------------------------------------|--------------|---------------------------------|---------------------------|-----------------------------------------|
| 11/4/20          | Maintenance on fire apparatus       | 1872         | 346                             | 124.56                    | <0.40                                   |
| 11/4/20          | Maintenance on fire apparatus       | 1392         | 372                             | 133.73                    | <0.37                                   |
| 11/4/20          | Maintenance on fire apparatus       | 1871         | 331                             | 117.51                    | <0.43                                   |
| 11/4/20          | Maintenance on fire apparatus       | 1875         | 308                             | 98.41                     | <0.51*                                  |
| 11/4/20          | Maintenance<br>on fire<br>apparatus | 1823         | 301                             | 107.76                    | <0.46                                   |
|                  | Exposur                             | e Point Conc | entration (El                   | PC) $(\mu g/m^3)^1$       | < 0.51                                  |

### Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

\* The pre- and post- flow rate was different by approximately 13%; therefore, this reporting limit is an estimate (the true reporting limit is between 0.47 and 0.55  $\mu g/m^3$ ).

### **Abbreviations**

 $\mu$ g/m<sup>3</sup> = micrograms per cubic meter Shaded represents the EPC Attachment 3-F-1. Surface Wipe Samples at the Fire Shop - arsenic, lead, and pentachlorophenol in units of µg/cm<sup>2</sup>

| Sampling | Cample ID    | Sampling<br>Location                                                  | Observations/                                                              | <b>4 :</b> - | Tand         | Complete             | Sampling<br>Location                                                     | Pentachloro- |
|----------|--------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------|--------------|----------------------|--------------------------------------------------------------------------|--------------|
| 11/4/20  | ENG583-A-1   | Left rear frame at differential                                       | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; very dirty          | <0.063       | Lead<br>0.54 | ENG-583-<br>PENTA-01 | Left rear<br>frame at<br>differential                                    | <0.0050      |
| 11/4/20  | ENG-558-A-01 | Captain's kick panel                                                  | Engine 558;<br>1998; F0561;<br>very dusty                                  | <0.063       | 0.059        | ENG-558-<br>PENTA-01 | Under<br>captain's chair                                                 | <0.0050      |
| 11/4/20  | ENG159-A-1   | Plumbing compartment                                                  | Engine 159;<br>F2174; very<br>dirty on piping                              | <0.063       | 0.25         | ENG159-<br>PENTA-1   | Plumbing compartment                                                     | <0.0050      |
| 11/4/20  | ENG-583-A-02 | Truck bed<br>where the hoses<br>sit                                   | Engine 583;<br>1998; F0581;<br>used in Bobcat<br>fire; some ashy<br>debris | <0.063       | 0.035        | ENG-583-<br>PENTA-02 | Truck bed<br>where the<br>hoses sit                                      | <0.0050      |
| 11/4/20  | ENG-168-A-01 | Fuel cell directly<br>underneath the<br>stainless steel<br>water tank | Engine 168;<br>F1567;<br>dusty/dirty                                       | <0.063       | 0.046        | ENG-168-<br>PENTA-01 | Fuel cell<br>directly<br>underneath the<br>stainless steel<br>water tank | <0.0050      |
| 11/4/20  | ENG-558-A-02 | Foam pump compartment                                                 | Engine 558;<br>1998; F0561;<br>dusty/dirty                                 | <0.063       | 0.030        | ENG-558-<br>PENTA-02 | Foam pump compartment                                                    | <0.0050      |
|          | Expo         | sure Point Conce                                                      | ntration (EPC) <sup>1</sup>                                                | < 0.063      | 0.16         |                      | EPC <sup>1</sup>                                                         | < 0.0050     |

Notes

1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

 $\frac{Abbreviations}{\mu g/cm^2 = micrograms \ per \ square \ centimeter}$  Shaded represents the EPC

**Bold** indicates detected result.

Attachment 3-F-2. Surface Wipe Samples at the Fire Shop - polycyclic aromatic hydrocarbons (PAHs) in units of µg/cm<sup>2</sup>

|                  | 1 2. Surrace       | Tripe Samples                                                            | at the Fire Shop -                                                      | polycyche arom | atic nyurocarb          | ons (171113) in | I I I I I I I I I I I I I I I I I I I |                           |                     | 1                          | 1                           |
|------------------|--------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------|-------------------------|-----------------|---------------------------------------|---------------------------|---------------------|----------------------------|-----------------------------|
| Sampling<br>Date | Sample ID          | Sampling<br>Location                                                     | Observations/<br>Notes                                                  | Naphthalene    | Benzo(a)-<br>anthracene | Chrysene        | Benzo(b)-<br>fluoranthene             | Benzo(k)-<br>fluoranthene | Benzo(a)-<br>pyrene | Indeno(1,2,3<br>-cd)pyrene | Dibenzo(a,h)-<br>anthracene |
| 11/4/20          | ENG-558-<br>PAH-01 | Under<br>captain's chair                                                 | Engine 558; 1998;<br>F0561; very dusty                                  | <0.0050        | <0.0050                 | <0.0050         | <0.0050                               | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| 11/4/20          | ENG-159-<br>PAH-01 | Plumbing compartment                                                     | Engine 159;<br>F2174; very dirty<br>on piping                           | <0.0050        | <0.0050                 | <0.0050         | <0.0050                               | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| 11/4/20          | ENG-583-<br>PAH-02 | Truck bed<br>where the<br>hoses sit                                      | Engine 583; 1998;<br>F0581; used in<br>Bobcat fire; some<br>ashy debris | <0.0050        | <0.0050                 | <0.0050         | <0.0050                               | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| 11/4/20          | ENG-583-<br>PAH-01 | Left rear<br>frame at<br>differential                                    | Engine 583; 1998;<br>F0581; used in<br>Bobcat fire; very<br>dirty       | <0.0050        | <0.0050                 | <0.0050         | <0.0050                               | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| 11/4/20          | ENG-558-<br>PAH-02 | Foam pump compartment                                                    | Engine 558; 1998;<br>F0561; dusty/dirty                                 | <0.0050        | <0.0050                 | <0.0050         | <0.0050                               | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
| 11/4/20          | ENG-168-<br>PAH-01 | Fuel cell<br>directly<br>underneath the<br>stainless steel<br>water tank | Engine 168;<br>F1567; dusty/dirty                                       | <0.0050        | <0.0050                 | <0.0050         | <0.0050                               | <0.0050                   | <0.0050             | <0.0050                    | <0.0050                     |
|                  |                    |                                                                          | EPC <sup>1</sup>                                                        | < 0.0050       | < 0.0050                | < 0.0050        | < 0.0050                              | < 0.0050                  | < 0.0050            | < 0.0050                   | < 0.0050                    |

Notes
1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

Abbreviations
EPC = exposure point concentration

µg/cm² = micrograms per square centimeter
Shaded represents the EPC

Bold indicates detected result.

Attachment 3-F-3. Surface Wipe Samples at the Fire Shop - PCBs and Dioxin/Furans in

units of µg/cm2

| Sample ID          | Sampling<br>Location                                                     | Observations/<br>Notes                                                  | РСВ ТЕО | Non-TEQ<br>PCB | Dioxin/<br>Furan TEQ |
|--------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------|---------|----------------|----------------------|
| ENG-558-<br>DFP-02 | Foam pump compartment                                                    | Engine 558; 1998;<br>F0561; dusty/dirty                                 | 1.2E-09 | 2.9E-05        | 1.8E-08              |
| ENG-583-<br>DFP-02 | Truck bed<br>where the<br>hoses sit                                      | Engine 583; 1998;<br>F0581; used in<br>Bobcat fire; some<br>ashy debris | 1.6E-09 | 3.6E-05        | 1.6E-08              |
| ENG-168-<br>DFP-01 | Fuel cell<br>directly<br>underneath the<br>stainless steel<br>water tank | Engine 168;<br>F1567; dusty/dirty                                       | 1.5E-09 | 3.3E-05        | 2.0E-08              |
| ENG-159-<br>DFP-1  | Plumbing compartment                                                     | Engine 159;<br>F2174; very dirty<br>on piping                           | 4.4E-09 | 2.3E-05        | 2.2E-08              |
| ENG-583-<br>DFP-01 | Left rear<br>frame at<br>differential                                    | Engine 583; 1998;<br>F0581; used in<br>Bobcat fire; very<br>dirty       | 5.1E-09 | 9.4E-05        | 3.0E-08              |
| ENG-558-<br>DFP-01 | Under<br>captain's chair                                                 | Engine 558; 1998;<br>F0561; very dusty                                  | 3.2E-09 | 3.0E-05        | 2.1E-08              |
|                    |                                                                          | EPC <sup>1</sup>                                                        | 2.8E-09 | 4.1E-05        | 2.1E-08              |

Notes
1. For data sets with more than five samples, the EPC was either (1) the average of the samples where the non-detects were treated as one-half of the detection limit, or (2) the maximum detection limit if the chemical was not detected in any sample. For data sets with fewer than five samples, the EPC was either (1) the maximum detected value, or (2) the maximum detection limit.

Abbreviations
EPC = Exposure Point Concentration µg/cm<sup>2</sup> = micrograms per square centimeter Shaded represents the EPC

Bold indicates detected result. PCBs = polychlorinated biphenyls

TEQ = toxic equivalence

# **ATTACHMENT 4**

# Dermal Absorption Factors

### **Attachment 4**

## **Dermal Absorption Factors**

Summaries of the scientific studies used to derive the dermal absorption percentages are presented below.

## Arsenic

A value of 6% was used as the percent of arsenic absorbed through the skin. This value is based on the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix F (OEHHA, 2012). OEHHA derived this value from the results of a study by Wester et al. (1993a).

Wester et al. (1993a) studied the *in vivo* percutaneous absorption of radiolabeled soluble arsenic (as  $H_3^{73}AsO_4$ ) from soil (180–300 µm). Doses of 0.00004 and 0.6 µg/cm² arsenic skin concentration were dermally applied to the abdomens of female rhesus monkeys (n=3 or 4 per dose group) in soil loadings of 40 mg soil/cm² for 24 hours. Urine samples were collected during the exposure period and for the subsequent six days. Percutaneous absorption was estimated as the ratio of urinary excretion following exposure to intravenous administration, the latter of which was radiolabeled <sup>73</sup>As in water administered in four monkeys. Percutaneous absorption for the low and high doses was reported to be  $4.5\pm3.2\%$  and  $3.2\pm0.9\%$ , respectively.

OEHHA noted several limitations to the Wester et al. (1993a) study that may have led to an underestimation of absorption, including (1) the large soil particle fraction used in the study compared to a particle size typically used in soil dermal absorption studies [<150 µm], (2) not investigating the mass of arsenic retained in the skin, and (3) the uncertainty of whether the soil remained in contact with the skin throughout the entire exposure period.

OEHHA averaged the low- and high-dose percutaneous absorption percentages (3.9%) from Wester et al. (1993a) and applied a factor of 1.63 to account for the increase in absorption potential from soil particles <150  $\mu$ m compared to the larger particles used in the study, based on evidence from Nico et al. (2006). The percutaneous absorption percentage was rounded to the nearest whole number (3.9% × 1.63 = 6.4% = 6%).

# Benzo(a)pyrene and PAHs

A value of 13% was used as the percent of PAHs as benzo[a]pyrene (BaP) absorbed through the skin. This value is based on the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix F (OEHHA, 2012). OEHHA derived this value from the results of a study by Wester et al. (1990).

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Wester et al. (1990) evaluated the *in vivo* dermal uptake of BaP in rhesus monkeys (n = 4). Soil (180–320  $\mu$ m) containing 10 ppm BaP was loaded (40 mg/cm²) to abdominal skin with a non-occluded protector for 24 hours. Urine was collected throughout the exposure period and for the six days following exposure. The dermal absorption percentage, corrected by taking into account absorption among a group of monkeys with intravenously administered BaP, was  $13.2\pm3.4\%$ .

OEHHA adopted an absorption factor of 13%, given that Wester et al. (1990) was an *in vivo* animal study and considered mass balance with the intravenous group. This adoption was supported with a study by Moody et al. (2007) that found a dermal absorption of 14.8% following human *in vitro* dermal exposure for 24 hours.

### Hexavalent chromium

A value of 2% was used as the percent of hexavalent chromium absorbed through the skin. This value is based on the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix F (OEHHA, 2012). OEHHA derived this value from the results of a study by Czernielewski et al. (1965).

Czernielewski et al. (1965) evaluated the whole-body absorption of radiolabeled hexavalent chromium (as  $Cr^{51}$ ) dermally applied to guinea pigs (n = 9) for 24 hours. One dose of a sodium chromate solution (15 µg in 0.1 mL) was applied to a 4-cm<sup>2</sup> shaved area. Following the exposure period, samples were taken from urine, feces, blood, heart, liver, spleen, adrenals, kidneys, lungs, lymphatics, and skin. A total absorbed dose of 2.9% was estimated, of which 1.6% was in blood, 1.1% in excreta, and 0.2% in the remaining organs and tissues.

To estimate an absorption factor associated with a soil vehicle, OEHHA applied a factor of 0.83, based on the maximum bioaccessibility of hexavalent chromium in synthetic sweat (Wainman et al., 1994). The soil vehicle absorption was rounded to the nearest whole number  $(2.9\% \times 0.83 = 2.41\% = 2\%)$ .

### Lead

A value of 3% was used as the percent of lead absorbed through the skin. This value is based on the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix F (OEHHA, 2012). OEHHA derived this value from the results of a study by Filon et al., 2006.

Filon et al. (2006) assessed the *in vitro* absorption of lead oxide (PbO) powder (<10  $\mu$ m) in human abdominal skin via diffusion cells 3.14 cm² in area (5 mg PbO/cm² and 2 mL synthetic sweat at pH 5.0). Following 24 hours, authors reported 0.06% fractional absorption into the skin and 6.4% (median) fractional absorption into the skin after surface decontamination. When PbO was removed with soap after 30 minutes, the mass of lead

absorbed over 24 hours was not reduced, suggesting that lead is absorbed rapidly through human skin.

OEHHA assumed that the fraction of lead absorbed in the skin was available for systemic absorption and applied a factor of 0.41 to correct for lead solubility in soil based on a study of heavily contaminated soil with a pH of 5.0 (Zhang et al., 1998). The absorption factor was rounded to the nearest whole number  $(6.4\% \times 0.41 = 2.6\% = 3\%)$ .

# Naphthalene

A value of 1.17% was used as the percent of naphthalene absorbed through the skin. This value is based on the results of a study by Riviere et al. (1999).

Riviere et al. (1999) used radiolabeled  $^{14}$ C-naphthalene in an *in vitro* porcine skin flaps study measuring percutaneous absorption and cutaneous disposition of jet fuels. Naphthalene is a primary aromatic constituent of jet fuel at 1.1%, and the addition of radiolabeled  $^{14}$ C-naphthalene as a marker compound only marginally increased the total naphthalene concentration to 1.21%. Researchers applied three formulations (Jet-A, JP-8, and JP-8(100)), in doses of 25  $\mu$ L of jet fuel containing 2  $\mu$ Ci of  $^{14}$ C-naphthalene, directly to the skin flap and then monitored the absorption, penetration, and distribution. Perfusate samples (3 mL) were collected every 5 minutes for the first 40 minutes, then every 10 minutes until 1.5 hours, and then every 15 minutes until termination at 5 hours. Naphthalene showed peak absorption at less than one hour, with a mean percent dose absorbed of 1.17 (n = 4) in one formulation. This study showed evidence that naphthalene is absorbed and has a minimal propensity to remain in the skin, although it tends to partition into subcutaneous fat after absorption.

# Pentachlorophenol

A value of 25% was used as the percent of pentachlorophenol (PCP) absorbed through the skin. This value is based on the USEPA Regional Screening Levels (USEPA, 2020) and USEPA Supplemental Guidance for Dermal Risk Assessment (USEPA, 2004). USEPA derived this value from the results of a study by Wester et al. (1993c).

Wester et al. (1993c) evaluated the *in vivo* percutaneous absorption of radiolabeled PCP ( $^{14}$ C) in soil. Soil containing 0.7 µg PCP/cm² was loaded to a 12-cm² abdominal area on rhesus monkeys (n = 4) for 24 hours. The abdominal area was protected by a non-occluded cover. Urine was collected during the exposure period and for the subsequent six days. Percutaneous absorption was estimated as the ratio of urinary excretion following exposure to intravenous administration, the latter of which was radiolabeled  $^{14}$ C administered in four monkeys. A resulting percutaneous absorption of PCP from a soil vehicle was estimated to be 24.4±6.4% following a 24-hour exposure. An average of 38% PCP was recovered in the test chamber, residue, and surface washes. USEPA adopted 25% as the PCP absorption factor from soil.

## PCBs (Total)

A value of 14% was used as the percent of total PCBs absorbed through the skin. This value is based on the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix F (OEHHA, 2012). OEHHA derived this value from the results of a study by Wester et al. (1993b).

Wester et al. (1993b) evaluated the *in vivo* dermal uptake of Aroclor 1242 (68% tri- and tetra- congeners) and Aroclor 1254 (83% penta- and hexa- congeners) in female rhesus monkeys (n = 4). Soils containing 44 ppm Aroclor 1242 and 23 ppm Aroclor 1254 were applied to a 12 cm² area of abdominal skin with a non-occluded patch for 24 hours. Soil loads were 40 mg/cm². After 24 hours of exposure, systemic absorption was measured through urine and feces samples, with samples being collected for an additional 34 days after the exposure period. Corrected dermal absorption percentages, taking into account absorption among a group of monkeys with intravenously administered PCBs, were 13.9% and 14.1% for Aroclor 1242 and Aroclor 1254, respectively. Authors compared their results to an *in vitro* assay using human skin, and the amount of absorption was found to vary by dosing vehicle, with partition coefficients of 13.8 and 14.1 for Aroclor 1242 and Aroclor 1254, respectively, when administered in soil.

OEHHA adopted an absorption factor of 14%, given that the Wester et al. (1993b) was an *in vivo* animal study and considered mass balance with the intravenous group.

# 2,3,7,8-Tetrachlorodibenzo-p-dioxin

A value of 3% was used as the percent of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) absorbed through the skin. This value is based on the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix F (OEHHA, 2012). OEHHA derived this value from the analysis and results of studies by USEPA (1992) and Roy et al. (2008).

USEPA (1992) and Roy et al. (2008) studied the absorption of TCDD from low organic soils (LOS) in rats *in vitro*, human *in vitro*, and rats *in vivo*. Exposures occurred in intervals for up to 96 hours. The LOS contained 1 ppm TCDD, and the soil loading on rat and human skin was 10 and 6 mg/cm², respectively. Following 24-hours, the percent of TCDD absorbed by rat skin *in vitro* was 1.17%, by human skin *in vitro* was 0.28%, and by rats *in vivo* was 7.9%. Steady-state dermal absorption was achieved after 24 hours in the *in vitro* studies; therefore, it was expected that the dose in the skin sample at 96 hours, after wiping, may be added to the percent absorbed after 24 hours to estimate a total percent absorbed. The percent in the skin sample at 96 hours, after wiping, was 1.4% in rats *in vitro* and 0.2% in human *in vitro*.

To estimate a 24-hour percent absorption in humans, OEHHA multiplied the 24-hour rat *in vivo* percent absorption by the ratio of the total percent absorbed in humans *in vitro* to absorbed in rats *in vitro*. This results in a human absorption percentage of 1.4% ( $7.9\% \times [0.48\% / 2.75\%] = 1.4\%$ ). To account for the difference of soil loading in the human *in* 

vitro study (6 mg/cm<sup>2</sup>) and a monolayer loading (3 mg/cm<sup>2</sup>), OEHHA included a factor of 2 in the absorption derivation. The absorption factor was rounded to the nearest whole number  $(1.4\% \times 2 = 2.8\% = 3\%)$ .

### References

Czernielewski A, Brykalski D, Depczyk D. 1965. Experimental investigations on penetration of radioactive chromium (Cr<sup>51</sup>) through the skin. Dermatologica 131(5):384–396.

Kraeling ME, Yourick JJ, Bronaugh RL. 2004. In vitro human skin penetration of diethanolamine. Food Chem Toxicol 42:1553–1561.

Moody RP, Joncas J, Richardson M, Chu I. 2007. Contaminated soils (I): In vitro dermal absorption of benzo[a]pyrene in human skin. J Toxicol Environ Health A 70(21):1858–1865.

Nico PS, Ruby MV, Lowney YW, Holm SE. 2006. Chemical speciation and bioaccessibility of arsenic and chromium in chromated copper arsenate-treated wood and soils. Environ Sci Technol 40(1):402–408.

Office of Environmental Health Hazard Assessment (OEHHA). 2012. Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis, August.

Riviere JE, Brooks JD, Monteiro-Riviere NA, Budsaba K, Smith CE. 1999. Dermal absorption and distribution of topically dosed jet fuels Jet-A, JP-8, and JP-8(100). Toxicol Appl Pharmacol 160:60–75.

Roy TA, Hammerstrom K, Schaum J. 2008. Percutaneous absorption of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) from soil. J Toxicol Environ Health A 71(23):1509–1515.

USEPA (U.S. Environmental Protection Agency). 1992. Dermal exposure assessment: Principles and applications. Interim Report. U.S. Environmental Protection Agency, Washington D.C. January 1992. EPA/600/8-91/011B.

USEPA (U.S. Environmental Protection Agency). 2004. Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). U.S. Environmental Protection Agency, Washington D.C. July 2004. EPA/540/R/99/005.

USEPA (U.S. Environmental Protection Agency). 2020. Regional Screening Levels (RSLs) - Generic Tables. As of November 2020. Accessed at <a href="https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables">https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables</a>.

Wester RC, Maibach HI, Bucks DA, Sedik L, Melendres J, Liao C, DiZio S. 1990. Percutaneous absorption of [14C]DDT and [14C]benzo[a]pyrene from soil. Fundam Appl Toxicol 15(3):510–516.

Wester RC, Maibach HI, Sedik L, Melendres J, Wade M. 1993a. In vivo and in vitro percutaneous absorption and skin decontamination of arsenic from water and soil. Fundam Appl Toxicol 20(3):336–340.

Wester RC, Maibach HI, Sedik L, Melendres J, Wade M. 1993b. Percutaneous absorption of PCBs from soil: In vivo rhesus monkey, in vitro human skin, and binding to powdered human stratum corneum. J Toxicol Environ Health 39(3):375–382.

Wester RC, Maibach HI, Sedik L, Melendres J, Wade M, DiZio S. 1993c. Percutaneous absorption of pentachlorophenol from soil. Fundam Appl Toxicol 20(1):68–71.

Zhang P, Ryan JA, Yang J. 1998. In vitro soil Pb solubility in the presence of hydroxyapatite. Environ Sci Technol 32(18):2763–2768.

# **ATTACHMENT 5**

# **Risk Calculations**

# Attachment 5-A. Risk calculations for inhalation exposures Risk calculations based on detected concentrations of elemicals of potential concern (COPCs)

|                                                         |          |              |             |           |              |           |              |                                           |            |         |                   |         |         |            |          | -N,N                 |             |                   |
|---------------------------------------------------------|----------|--------------|-------------|-----------|--------------|-----------|--------------|-------------------------------------------|------------|---------|-------------------|---------|---------|------------|----------|----------------------|-------------|-------------------|
|                                                         |          |              |             |           |              |           |              | Diesel                                    |            |         |                   |         |         |            | D        | Dimethyl- Respirable | espirable   |                   |
|                                                         |          |              |             |           |              | Formalde- | Tetrachloro- | Tetrachloro- Particulates <sup>2</sup> as | Hexavalent |         |                   |         |         |            |          | Para- cı             | crystalline |                   |
| Location/Specialized task                               | Benzene  | Ethylbenzene | Naphthalene | Styrene   | Acetaldehyde | hyde      | ethylene     | elemental carbon Chromium                 | Chromium   | Arsenic | Beryllium Cadmium | Cadmium | Cobalt  | Nickel     | Lead T   | oluidine             | silica      | <b>Fotal Risk</b> |
| Inhalation Unit Risk (IUR) (µg/m³)-1                    | 0.000029 | 0.0000025    | 0.000034    | 0.0000074 | 0.0000027    | 0.000013  | 0.0000061    | 0.00030                                   | 0.15       | 0.0043  | 0.0024            | 0.0042  | 0.0000  | 0.00026 0. | 0.000012 |                      | NE3         | :                 |
| Air Operations                                          |          |              | :           |           |              | :         | :            | :                                         | 2.3E-03    | -       |                   |         | -       |            |          |                      |             | 2E-03             |
| Breathing Apparatus Shop - Small Engine Repair Shop     | 3.0E-03  |              | :           | :         | 1.1E-05      | 5.6E-05   |              | :                                         |            | -       |                   |         | -       |            |          | :                    |             | 3E-03             |
| Eastern Fire Shop                                       |          |              | :           |           |              | :         | 3.6E-02      | :                                         |            | -       |                   |         | -       |            |          | :                    |             | 4E-02             |
| Eastern Fire Shop - Welding/grinding/cutting activities |          |              |             | -         |              |           |              |                                           |            |         |                   |         | 1.3E-06 | 3.9E-07    |          |                      | -           | 2E-06             |
|                                                         |          |              |             |           |              |           |              |                                           |            |         |                   |         |         |            |          |                      |             |                   |

| casient rue snop - weiding/grinding/cuting activities                                             |                      |                            |             |           |                                   |           | :            | **                                                             |                                 |         |                                         |         | 1.3E-U0 5.9E-U/ | 3.9E-U/ |          |                      |             | ZE-04 |
|---------------------------------------------------------------------------------------------------|----------------------|----------------------------|-------------|-----------|-----------------------------------|-----------|--------------|----------------------------------------------------------------|---------------------------------|---------|-----------------------------------------|---------|-----------------|---------|----------|----------------------|-------------|-------|
| Servening risk calculations based on detection limits for chemicals of potential concern (COPCs)* | als of potential cor | teern (COPCs) <sup>4</sup> |             |           |                                   |           |              |                                                                |                                 |         |                                         |         |                 |         |          |                      |             |       |
|                                                                                                   |                      |                            |             |           |                                   |           |              |                                                                |                                 |         |                                         |         |                 |         |          | -N'N                 |             |       |
|                                                                                                   |                      |                            |             |           |                                   |           |              | Diesel                                                         |                                 |         |                                         |         |                 |         |          | Dimethyl- Respirable | Sespirable  |       |
|                                                                                                   |                      |                            |             |           |                                   | Formalde- | Tetrachloro- | Formalde- Tetrachloro- Particulates <sup>2</sup> as Hexavalent | Hexavalent                      |         |                                         |         |                 |         |          | Para- crystalline    | crystalline |       |
| Location                                                                                          | Benzene              | Ethylbenzene               | Naphthalene |           | Styrene <sup>5</sup> Acetaldehyde | hyde      | ethylene     | ethylene elemental carbon Chromium                             | Chromium                        | Arsenic | Arsenic Beryllium Cadmium Cobalt Nickel | Cadmium | Cobalt          | Nickel  | Lead     | Toluidine            | silica      |       |
| Inhalation Unit Risk (IUR) (µg/m³)-1                                                              | 0.000029             | 0.0000025                  | 0.000034    | 0.0000074 | 0.0000027                         | 0.000013  | 0.0000061    | 0.00030                                                        | 0.15                            | 0.0043  | 0.0024                                  | 0.0042  | 060000          | 0.00026 | 0.000012 | NE                   | $NE^{3}$    |       |
| Air Operations                                                                                    | 3.3E-04              | 3.7E-04                    | 5.5E-03     | 1         | 1                                 | 1         | 1            |                                                                | NA                              | 1       | 1                                       | 1       | 1               | 1       | 1        | 1                    | 1           |       |
| Breathing Apparatus Shop                                                                          | NA                   | 3.9E-04                    | 6.3E-03     | 1.1E-03   | NA                                | NA        | 1            |                                                                | 1                               | 1       | 1                                       | 1       | 1               | 1       | 1        | 1                    | 1           |       |
| Eastern Fire Shop                                                                                 | 3.4E-04              | 3.8E-04                    | 5.6E-03     | -         | -                                 | -         | NA           | 1.2E-04                                                        |                                 | -       | -                                       | -       | -               | -       |          | -                    |             |       |
| Eastern Fire Shon - Welding/orinding/outfing activities                                           | 1                    | ,                          |             | -         |                                   |           |              | 1                                                              | 2 4E-04 3 0E-04 8 2E-07 8 0E-06 | 3 OF-04 | 8 2E-07                                 | 90-30 8 | VΑ              | VΛ      | 1.75-07  |                      | ,           | _     |

# Cancer Risk = Ca/PF \* ET \* EF \* ED \* IUR

| )escription                                                   | Parameter      | Units                 | Value                          |
|---------------------------------------------------------------|----------------|-----------------------|--------------------------------|
| Ancentration in A ir                                          | C <sub>a</sub> | sw/m <sub>3</sub>     | Chemical-<br>specific/measured |
| nhalation unit risk                                           | IUR<br>IUR     | (ug/m³) <sup>-1</sup> | Chemical-specific              |
| (espirator protection factor (welding only)                   | PF             | ()                    | 10                             |
| Exposure time (Air Operations ratio)                          | ET AO f        | 9 hours/24 hours      | 0.38                           |
| Exposure time (Eastern Fire Shop ratio)                       | ET FS f        | 9 hours/24 hours      | 0.38                           |
| Exposure time (Breathing Apparatus Shop ratio)                | ET             | 8 hours/24 hours      | 0.33                           |
| exposure frequency ratio 1 (Air Operations)                   | EF_1           | 280 days/365 days     | 0.77                           |
| Exposure frequency ratio 2 (Breathing Apparatus Shop)         | EF_2           | 262 days/365 days     | 0.72                           |
| Exposure frequency ratio 3 (Eastern Fire Shop)                | EF_3           | 247 days/365 days     | 89'0                           |
| Exposure frequency ratio 4 (welding at the Eastern Fire Shop) | EF_4           | 12 days/365           | 0.033                          |
| Exposure duration ratio                                       | ED             | 45 years/70 years     | 990                            |

- Notes:

  1. These calculation based on maximum detected concentration in air (Ca).

  2. These values on maximum detected concentration in air (Ca).

  3. Nor inhalition unit risk (UR) for expression of desel particulate as elemental carbon but it was determined to be an outlier and removed from the dataset. Therefore, the risk calculation is based on the detection limit (see screening risk calculation or in risk (UR) for expression and risk via inhalition exposure could not be calculated. However, all samples were non-detect.

  4. Sercentral size skellarismum detection limit (see screening risk calculation based on maximum detection limit (see screening risk calculation).

  5. ToxStrategies derived the IUR for styrene using OEHHA. 2010 and Cruzan et al., 2001.

Abbreviations
CCR = California Cope of Regulations
CCR = California Cope of Regulations
CCR = California Cope of Regulations
UR = inhalation unit risk
= elemental on measured
NR = inhalation unit risk on essablished
NR = individuo unit risk on essablished
NR = individuo unit risk on essablished
NR = individuo quantisk on essablished
Chemical of apertial concern (COPC) not measured and not relevant to this location.
Red shading indicates risks greater than 1 in 10,000 (1E-04)

# Attachment 5-B. Risk calculations for dermal exposures

# Risk calculations based on detected concentrations of chemicals of potential concern (COPCs)

|                                              |                                                               |                                       |             | Hexavalent |         |         | Pentachloro- Benzo(a) | Benzo(a)   |          | Benzo(b)                  | Benzo(k)     | Benzo(a) | Benzo(a) Indeno(1,2,3- Dibenzo(a,h) | Dibenzo(a,h)            | _       | Non-TEQ Dioxin/Furan | oxin/Furan |              |
|----------------------------------------------|---------------------------------------------------------------|---------------------------------------|-------------|------------|---------|---------|-----------------------|------------|----------|---------------------------|--------------|----------|-------------------------------------|-------------------------|---------|----------------------|------------|--------------|
| Job Task                                     | Location                                                      | Sample Description                    | Naphthalene | Chromium   | Arsenic | Lead    | phenol                | anthracene | Chrysene | fluoranthene fluoranthene | fluoranthene | pyrene   | cd)pyrene                           | anthracene PCB-TEQ      | PCB-TEQ | PCB                  | TEQ        | Potest Diely |
|                                              | Oral Si                                                       | Oral Slope Factor (SFO) (mg/kg-day)-1 | 1.2E-01     | 5.0E-01    | 9.5E+00 | 8.5E-03 | 4.0E-01               | 1.0E-01    | 1.0E-03  | 1.0E-01                   | 1.0E-02      | 1.0E+00  | 1.0E-01                             | 4.1E+00 1.3E+05 2.0E+00 | 1.3E+05 | 2.0E+00              | 1.3E+05    | otal Misk    |
|                                              | Derm                                                          | Dermal Absorption Factor (Abs) (%)    | 1.17%       | 2.0%       | %0.9    | 3.0%    | 25%                   | 13%        | 13%      | 13%                       | 13%          | 13%      | 13%                                 | 13%                     | 3.0%    | 14%                  | 3.0%       |              |
| Fraction of conta                            | Fraction of contaminant absorbed in gastrointestinal tract (C | testinal tract (GIABS) (unitless)     | 1           | 0.025      | 1       | 1       | 1                     | 1          | 1        | 1                         | 1            | 1        | 1                                   | 1                       | 1       | 1                    | 1          |              |
| Intermediate & heavy maintenance on aircraft | Air Operations                                                | Various engine or aircraft parts      |             | 6.1E-07    | -       | 4.2E-09 |                       |            | -        | :                         |              |          | 1                                   |                         | 4.9E-09 | 8.6E-10              | 6.2E-08    | 7E-07        |
| Intermediate & heavy maintenance on aircraft | Air Operations                                                | Mastinox on parts                     | -           | 1.5E-05    | -       | 1       | 1                     | 1          | 1        | 1                         | 1            | 1        | ;                                   | 1                       | 1       | 1                    | 1          | 2E-05        |
| Repair and tune-up of air packs              | Breathing Apparatus Shop                                      | Air packs                             | 6.3E-09     |            |         | 5.1E-09 | ,                     | 1.9E-07    | 2.0E-09  | 3.3E-07                   | 6.3E-09      | 1.7E-06  | 1.4E-07                             | 1.5E-06                 | 6.2E-09 | 5.2E-09              | 1.0E-07    | 4E-06        |
| Fire hose repair                             | Breathing Apparatus Shop                                      | Fire hose                             |             | -          |         | 8.7E-09 |                       | -          |          |                           | -            | -        | :                                   | -                       | 1       | :                    | -          | 9E-09        |
| Maintenance/nenair on fire annaratus         | Fastern Fire Shon                                             | Fine annaratus                        |             |            |         | 3.8F±08 |                       |            |          |                           |              |          |                                     |                         | 1 0F.08 | 1.1E,08              | 7.7F.08    | 1E_07        |

|                                              |                              |                                                                               |             | Hexavalent |         |         | Pentachloro- Benzo(a) | Benzo(a)   |          | Benzo(b)     | Benzo(k)             | Benzo(a) | Indeno(1,2,3- Dibenzo(a,h) | Dibenzo(a,h) |          | Non-TEQ D        | Dioxin/Furan |
|----------------------------------------------|------------------------------|-------------------------------------------------------------------------------|-------------|------------|---------|---------|-----------------------|------------|----------|--------------|----------------------|----------|----------------------------|--------------|----------|------------------|--------------|
| Job Task                                     | Location                     | Sample Description                                                            | Naphthalene | Chromium   | Arsenic | Lead    | phenol                | anthracene | Chrysene | fluoranthene | fluoranthene         | pyrene   | cd)pyrene                  | anthracene   | PCB-TEQ2 | PCB <sup>3</sup> | $TEQ^4$      |
|                                              | Oral SI                      | Oral Slope Factor (SFO) (mg/kg-day) <sup>-1</sup>                             | 1.2E-01     | 5.0E-01    | 9.5E+00 | 8.5E-03 | 4.0E-01               | 1.0E-01    | 1.0E-03  | 1.0E-01      | 1.0E-02              | 1.0E+00  | 1.0E-01                    | 4.1E+00      | 1.3E+05  | 2.0E+00          | 1.3E+05      |
|                                              | Derm:                        | Dermal Absorption Factor (Abs) (%)                                            | 1.17%       | 2.0%       | %0.9    | 3.0%    | 75%                   | 13%        | 13%      | 13%          | 13%                  | 13%      | 13%                        | 13%          | 3.0%     | 14%              | 3.0%         |
| Fraction of contai                           | minant absorbed in gastroint | Fraction of contaminant absorbed in gastrointestinal tract (GIABS) (unitless) | 1           | 0.025      | 1       | 1       | 1                     | 1          | 1        | 1            | 1                    | 1        | 1                          | 1            | 1        | 1                | 1            |
| Intermediate & heavy maintenance on aircraft | Air Operations               | Various engine or aircraft parts                                              | 7.4E-09     | NA         | 3.8E-05 | NA      | -                     | 6.9E-08    | 6.9E-10  | 6.9E-08      | 60-36 <sup>.</sup> 9 | 6.9E-07  | 80-36'9                    | 2.8E-06      | VN       | NA               | NA           |
| Intermediate & heavy maintenance on aircraft | Air Operations               | Mastinox on parts                                                             |             | NA         | -       | -       | 1                     |            | -        | 1            |                      | +        | +                          | +            |          |                  | +            |
| Repair and tune-up of air packs              | Breathing Apparatus Shop     | Air packs                                                                     | NA          | 1          | 3.1E-05 | NA      | 4.4E-07               | NA         | NA       | NA           | NA                   | NA       | NA                         | NA           | NA       | NA               | NA           |
| Fire hose repair                             | Breathing Apparatus Shop     | Fire hose                                                                     | 6.2E-09     | 1          | 3.1E-05 | NA      |                       | 5.7E-08    | 5.7E-10  | 5.7E-08      | 5.7E-09              | 5.7E-07  | 5.7E-08                    | 2.3E-06      | 1        | -                | :            |
| Maintenance/repair on fire apparatus         | Eastern Fire Shop            | Fire apparatus                                                                | 6.5E-09     | -          | 3.3E-05 | NA      | 4.6E-07               | 6.0E-08    | 6.0E-10  | 6.0E-08      | 6.0E-09              | 6.0E-07  | 6.0E-08                    | 2.5E-06      | NA       | NA               | NA           |
|                                              |                              |                                                                               |             |            |         |         |                       |            |          |              |                      |          |                            |              |          |                  |              |

 $Cancer\ Risk = [Csw * CF * SAf * Abs * EV * EF * ED \_y * (SFO/GIABS)] / (ATca * BW)$ 

| Description                                                | Parameter | Units                     | Value                          |
|------------------------------------------------------------|-----------|---------------------------|--------------------------------|
| Concentration on surface wipe                              | Csw       | μg/cm²-event              | Chemical-<br>specific/measured |
| Surface area of the fingers                                | SAf       | cm <sup>2</sup>           | 61                             |
| Percent absorption                                         | Abs       | %                         | Chemical-specific              |
| Event Frequency (Air Operations)                           | EV AO     | events/day                | 6                              |
| Event Frequency (Eastern Fire Shop)                        | EV FS     | events/day                | 6                              |
| Event Frequency (Breathing Apparatus Shop)                 | EV        | events/day                | 8                              |
| Event Frequency (Air Operations_Mastinox)                  | EV_M      | events/day                | 1                              |
| Exposure frequency 1 (Air Operations)                      | EF_AO     | days/year                 | 280                            |
| Exposure frequency 2 (Breathing Apparatus Shop)            | EF BA     | days/year                 | 262                            |
| Exposure frequency 3 (Eastern Fire Shop)                   | EF FS     | days/year                 | 247                            |
| Exposure frequency 4 (Air Operations_Mastinox)             | EF_M      | days/year                 | 168                            |
| Exposure duration                                          | ED_y      | years                     | 45                             |
| Averaging time                                             | ATca      | days                      | 25550                          |
| Body weight                                                | BW        | kilograms                 | 80                             |
| Oral slope factor                                          | SFO       | (mg/kg-day) <sup>-1</sup> | Chemical-specific              |
| Fraction of contaminant absorbed in gastrointestinal tract | GIABS     | unitless                  | Chemical-specific              |
| Conversion factor                                          | CF        | Bri/Bu                    | 0.001                          |

Notes

1. Risk calculation based on representative concentration on surface wipe (Csw).

2. Screening risk eductation based on maximum detection limit.

Abheroinium
COPC – denoise of potential conterm
GARS – fraction of contaminant absorbed in gestrointestinal tract (unitless)
GARS – fraction of contaminant absorbed in gestrointestinal tract (unitless)
GARS – fraction of contaminant absorbed in gestrointestinal tract (unitless)
As – in organizable chemical described, so screening risk calculations were performed using the detected concentration
PCB – probybdremated biphory!
SFO – oral slope factor
TEQ – oxet equivalence
Jugoria – oxet equivalence
Jugoria – oxet equivalence
Magnatic – per (unifigrams per kilogram-day)
(mg/eg-day)\* – per (unifigrams per kilogram-day)
(mg/eg-day)\* – per (unifigrams per kilogram-day)
— e-bernical not measured.

Chemical of potential concern (COPC) not measured and not relevant to this location.

# Attachment 5-C. Risk calculations for ingestion exposures

# Risk calculations based on detected concentrations of chemicals of potential concern (COPCs)<sup>1</sup>

| PCB-TEQ         PCB         TEQ         Total Risk           1.3E+05         2.0E+00         1.3E+05         Total Risk           100%         100%         100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PCB         TEQ         T           2.0E+00         1.3E+05         T           100%         100%         3.1E-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PCB TEQ T<br>2.0E+00 1.3E+05<br>100% 100%<br>3.1E-09 1.0E-06                              | 2.0E-00 1.3E-05 T<br>100% 1.0B-05 3.1E-09 1.0E-06 1.8E-08 1.7E-06                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.3E+05<br>100%<br>8.2E-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1.3E+05<br>100%<br>8.2E-08                                                                | 1.3E+05<br>100%<br>8.2E-08<br><br>1.0E-07                                                                                                           |
| 1.0E-01<br>100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| .0E-02 1.0E+00<br>100% 100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| 1.0E-01 1.0E-02<br>100% 100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| 1.0E-03<br>100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| Relative Bioavailability (RBA) (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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                                                                                                                                                                 | Intermediate & heavy maintenance on aircraft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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                                                                                                                                                                 | Air Operations Various cargino or aircraft parts 3.8E-07 4.2E-08 8.2E-08 1.1E-09 1.0E-06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | t Air Operations Various engine or aircraft parts 1.6E-43 4.2E-48                         | Name on aircraft         Art Operations         Various engine or aircraft parts                                                                    |
| Air Operations         Maskinox on parts         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         —         — <th< th=""><td>ks Brentling Apparatus Shop   Air peaks 2.7E-07 - 5.1E-08 - 7.3E-07 7.7E-09 1.3E-06 2.4E-08 6.6E-06 5.2E-07 5.9E-06 1.0E-07 1.8E-08 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.</td><td></td><td></td></th<> | ks Brentling Apparatus Shop   Air peaks 2.7E-07 - 5.1E-08 - 7.3E-07 7.7E-09 1.3E-06 2.4E-08 6.6E-06 5.2E-07 5.9E-06 1.0E-07 1.8E-08 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1.7E-06 1. |                                                                                           |                                                                                                                                                     |

| Screening risk calculations based on detection limits for chemicals of potential concern (COPCs) <sup>3</sup> | for chemicals of potential cor     | meern (COPCs) <sup>3</sup>            |             |            |         |         |              |            |          |              |              |          |                            |              |         |                      |             |
|---------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------|------------|---------|---------|--------------|------------|----------|--------------|--------------|----------|----------------------------|--------------|---------|----------------------|-------------|
|                                                                                                               |                                    |                                       |             | Hexavalent |         |         | Pentachloro- | Benzo(a)   |          | Benzo(b)     | Benzo(k)     | Benzo(a) | Indeno(1,2,3- Dibenzo(a,h) | Dibenzo(a,h) | _       | Non-TEQ Dioxin/Furan | ioxin/Furan |
| Job Task                                                                                                      | Location                           | Sample Description                    | Naphthalene | Chromium   | Arsenic | Lead    | phenol       | anthracene | Chrysene | fluoranthene | fluoranthene | pyrene   | cd)pyrene                  | anthracene   | PCB-TEQ | PCB                  | TEQ         |
|                                                                                                               |                                    | Oral Slope Factor (SFO) (mg/kg-day)-1 | 1.2E-01     | 5.0E-01    | 9.5E+00 | 8.5E-03 | 4.0E-01      | 1.0E-01    | 1.0E-03  | 1.0E-01      | 1.0E-02      | 1.0E+00  | 1.0E-01                    | 4.1E+00      | 1.3E+05 | 2.0E+00              | 1.3E+05     |
|                                                                                                               |                                    | Relative Bioavailability (RBA) (%)    | 100%        | 100%       | %09     | %09     | 100%         | 100%       | 100%     | 100%         | 100%         | 100%     | 100%                       | 100%         | 100%    | 100%                 | 100%        |
| Intermediate & heavy maintenance on aircraft                                                                  | Air Operations                     | Various engine or aircraft parts      | 3.2E-07     | NA         | 1.9E-04 | NA      | -            | 2.6E-07    | 2.6E-09  | 2.6E-07      | 2.6E-08      | 2.6E-06  | 2.6E-07                    | 1.1E-05      | NA      | NA                   | NA          |
| Intermediate & heavy maintenance on aircraft                                                                  | Air Operations                     | Mastinox on parts                     | :           | VA         |         | 1       | :            |            |          |              |              |          |                            |              |         |                      |             |
| Repair and tune-up of air packs                                                                               | Breathing Apparatus Shop Air packs | Air packs                             | NA          |            | 1.6E-04 | NA      | 8.8E-07      | NA         | NA       | NA           | NA           | NA       | NA                         | NA           | NA      | NA                   | NA          |
| Fire hose repair                                                                                              | Breathing Apparatus Shop Fire hose | Fire hose                             | 2.6E-07     | :          | 1.6E-04 | NA      |              | 2.2E-07    | 2.2E-09  | 2.2E-07      | 2.2E-08      | 2.2E-06  | 2.2E-07                    | 90E-06       | -       |                      |             |
| Maintenance/ repair on fire apparatus                                                                         | Eastern Fire Shop                  | Fire apparatus                        | 2.8E-07     |            | 1.7E-04 | NA      | 9.3E-07      | 2.3E-07    | 2.3E-09  | 2.3E-07      | 2.3E-08      | 2.3E-06  | 2.3E-07                    | 9.5E-06      | NA      | NA                   | NA          |

 $Cancer\ Risk = (Csw\ ^*\ CF\ ^*\ SAf\ ^*\ Fdirect\ ^*\ RBA\ ^*\ \gamma - d\ ^*\ ET\_hours\ ^*\ EF\ ^*\ ED\_y\ ^*\ SFO)((ATca\ ^*\ BW)$ 

| Description                                     | Parameter | Units                     | Value                          |
|-------------------------------------------------|-----------|---------------------------|--------------------------------|
| Concentration on surface wipe                   | Csw       | µg/cm²                    | Chemical-<br>specific/measured |
| Surface area of fingers                         | SAf       | cm <sup>2</sup>           | 61                             |
| Direct transfer factor                          | Fdirect   | ratio                     | 0.5                            |
| Relative bioavailability                        | RBA       | %                         | Chemical-specific              |
| Contacts per hour                               | h-d       | per hour                  | 1                              |
| Exposure time (Air Operations)                  | ET_AO     | hours/day                 | 6                              |
| Exposure time (Eastern Fire Shop)               | ET_FS     | hours/day                 | 6                              |
| Exposure time                                   | ET_hours  | hours/day                 | 8                              |
| Exposure time_Mastinox                          | ET_M      | hours/day                 | 1                              |
| Exposure frequency 1 (Air Operations)           | EF_AO     | days/year                 | 280                            |
| Exposure frequency 2 (Breathing Apparatus Shop) | EF BA     | days/year                 | 262                            |
| Exposure frequency 3 (Eastern Fire Shop)        | EF_FS     | days/year                 | 247                            |
| Exposure frequency 4 (Air Operations Mastinox)  | EF_M      | days/year                 | 168                            |
| Exposure duration                               | ED_y      | years                     | 45                             |
| Oral slope factor                               | SFO       | (mg/kg-day) <sup>-1</sup> | Chemical-specific              |
| Averaging time                                  | ATca      | days                      | 25550                          |
| Body weight                                     | BW        | kilograms                 | 80                             |
| Conversion factor                               | CF        | Bh/sm                     | 0.001                          |

Note:

1. Risk calculation based on maximum detected concentration on surface wipe (Csw).

2. The USEPA recommends a default value of 60% for relative bisavailability (RBA) of arsenic and load in soil (U.S. EPA, 2021a and 2021b). All other COPCs have a default RBA of 100%.

3. Sereening risk calculation based on maximum detection limit.

Abbreviations

COPC – chemical of potential concern

RAA = chemical of potential concern

RAA = chemical obtained (%)

NA = roun opplicable; chemical detected, so screening risk calculations were performed using the detected concentration.

PCB = polychlorunaid detected, so screening risk calculations were performed using the detected concentration.

PCB = polychlorunaid detected, so screening risk calculations were performed using the detected concentration.

PCB = polychlorunaid expensions per square continuetes

of present (with expensions) = per (milligames per kinggmm-day)

my up, a milligame per micrograms

- exhorminal not measured

Chemical of potential concern (COPC) not measured and not relevant to this location.

Red shading indicates risks greater than 1 in 10,000 (TE-04)