

OCCUPATIONAL SAFETY AND HEALTH
STANDARD BOARD

PETITION FILE NO. 573

BOARD STAFF EVALUATION

Submitted by: Maryrose Chan, Senior Safety Engineer *M. Chan*

February 20, 2019

INTRODUCTION

On December 13, 2018, Mitch Steiger, representative for the California Labor Federation, Douglas L. Parker, representative for Worksafe, and Anne Katten, representative for California Rural Legal Assistance Foundation (Petitioner) submitted a petition letter, which was designated as Petition No. 573.

The Petition seeks new standards to protect outdoor workers in areas impacted by unhealthy levels of wildland smoke through the emergency rulemaking process.

BACKGROUND

The 2018 California wildfire season was one of the worst on record in terms of the number of acreage burned; which is related to the amount of smoke generated. The first incident of wildland fire started on February 18, 2018 and the last wildfire incident started on November 8, 2018. The peak months for wildland fire events were July, August, September, and November.

Fires Responded to by Local, State, Federal, and Tribal Firefighting Agencies

Interval	Fires	Acres	Annual Acreage Burn Percent Change
January 1, 2018 through December 30, 2018 (CAL FIRE only)	6,266	876,131	
2018 Combined YTD (CAL FIRE & US Forest Service)	7,571	1,671,203	33.8%
January 1, 2017 through December 31, 2017 (CAL FIRE & US Forest Service)	9,133	1,248,606	86.5%
January 1, 2016 through December 31, 2016 (CALFIRE & US Forest Service)	6,954	669,534	-24%
January 1, 2015 through December 31, 2015 (CAL FIRE & US Forest Service)	8,283	880,899	40.8%
January 1, 2015 through December 31, 2014 (CAL FIRE & US Forest Service)	7,233	625,540	

http://cdfdata.fire.ca.gov/incidents/incidents_statsevents

REQUESTED ACTION

The Petitioner is asking for a regulation that is triggered when the Air Quality Index (AQI) measurements reach “Unhealthy” readings due to wildfire smoke. The standards would apply to outdoor occupations such as agriculture, construction, landscaping, maintenance, commercial delivery, and other activities not considered to be “first response”.

The Petitioner is requesting emergency standards that require the implementation of “feasible” controls:

- Engineering controls such as enclosed structures or vehicle cabs with filtered air for rest and meal periods
- Administrative controls such as changes in work location and schedules, reduction in work intensity, additional rest periods
- Respiratory protection

PETITIONERS ASSERTIONS

The Petitioner stated that there is an urgent need to protect workers who must labor outdoors in areas where the air quality meets or exceeds AQI “Unhealthy” level such as the wildfire smoke California experienced during the catastrophic fires in 2018. The Petitioner asserts that an emergency standard is needed because wildfires are now occurring during many months of the year.

The Petitioner is concerned about the adverse health effects due to the inhalation of wildfire smoke. Wildfire smoke contains high levels of fine particulate matter (PM 2.5-particulates that have an aerodynamic diameter of 2.5 micrometers or less). Exposure to fine particulates can reduce lung function, worsen heart and lung conditions, and cause coughing, wheezing, and difficulty breathing.

STAFF EVALUATION

PUBLIC HEALTH

Air Quality Index <https://airnow.gov/index.cfm?action=aqibasics.aqi>

The Air Quality Index (AQI) was developed by the Environmental Protection Agency (EPA) to make it easier for the public to understand the health impacts of air pollution. The EPA calculates the AQI for five major air pollutants: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. Sources of pollutants (gases and particulates) include power plants, factories, vehicle exhaust, dust, pollen, and other by products of incomplete combustion. In addition, weather conditions (e.g. wind, inversion, topography, clear cloudless skies) affect the AQI by diluting or trapping contaminants.

EPA’s PM 10 level (includes particulates that have an aerodynamic diameter that are 10 micrometers or less) corresponds to the Occupational Safety and Health Administration (OSHA)

Permissible Exposure Limit (PEL) for respirable dust in terms of particle size. However, the EPA limit for particulates is based on a 24-hour exposure while the OSHA PEL is based on an 8-hour exposure. In addition, EPA and OSHA have different sampling methods.

OSHA does not have a PEL specific to finer particles (PM 2.5). Composition of larger particles are typically natural sources: soil, dust, seasalt, bioaerosol. Absent of a wildfire, composition of finer particles are typically particles created by human activity: sulfates, nitrates, ammonia, carbon, and lead.

Each day, monitors record concentrations of the major pollutants at more than a thousand locations across the country. These raw measurements are converted into a separate AQI value for each pollutant (ground-level ozone, particle pollution, carbon monoxide, and sulfur dioxide) using standard formulas developed by EPA. The highest of these AQI values is reported as the AQI value for that day.

Locations that are more populated have more monitoring stations. Link for the location of monitoring stations: <https://aqicn.org/map/california/#@g/32.7703/-121.7285/5z>

The EPA uses the following display to aid the public in interpreting the data:

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
<i>When the AQI is in this range:</i>	<i>..air quality conditions are:</i>	<i>...as symbolized by this color:</i>
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

The category corresponds to a different level of health concern. The six levels of health concern and what they mean are:

"Good" AQI is 0 to 50. Air quality is considered satisfactory, and air pollution poses little or no risk.

"Moderate" AQI is 51 to 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.

"Unhealthy for Sensitive Groups" AQI is 101 to 150. Although the general public is not likely to be affected at this AQI range, people with lung disease, older adults and children are at a greater risk from exposure to ozone, whereas persons with heart and lung disease, older adults and children are at greater risk from the presence of particles in the air.

"Unhealthy" AQI is 151 to 200. Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.

"Very Unhealthy" AQI is 201 to 300. This would trigger a health alert signifying that everyone may experience more serious health effects.

"Hazardous" AQI greater than 300. This would trigger a health warnings of emergency conditions. The entire population is more likely to be affected.

Air Quality Index Report vs Acreage Burned

As apparent in the table below, the number of acres that burned in a particular county does not necessarily mean that the county will have the highest number of AQI days that are deemed "Unhealthy". Certain areas and counties have unhealthy air quality, which is worsened by wildfire smoke.

2017: Air Quality vs. Acreage Burned

Counties	"Number of Days when Air Quality Was "Unhealthy"	Number of Days when Air Quality was "Very Unhealthy"	Acreage Burned
Ventura/Santa Barbara	17	7	281,893
Siskiyou	1	0	174,362
Mariposa	9	0	95,196
San Bernardino	51	23	1,763
Riverside	43	8	16,405
Los Angeles	38	8	29,284

https://en.wikipedia.org/wiki/2017_California_wildfires

The number of AQI days was generated were based on AirData reports:

<https://www.epa.gov/outdoor-air-quality-data>

The 2018 annual statistics from the EPA will not be finalized until May 1, 2019.

Camp Fire Effect on Air Quality

To understand the degree of how the air quality was being affected by the most recent wildfires, Board staff reviewed the reported daily average concentration of one of the monitoring site during the Camp Fire. Below are the readings from the air monitoring site in Chico during Camp Fire which started November 8, 2018 and ended November 25, 2018.

Chico Area Site 060070008

Date	Pollutant	Daily Average Concentration	Daily AQI	Category
11/7/2018	Ozone PM 2.5 PM 10	41 ppb 2.9 ug/m ³ 26 ug/m ³	38 12 24	Good
11/8/2018	Ozone PM 2.5 PM 10	37 ppb 6.2 ug/m ³ 43 ug/m ³	34 26 40	Good
11/9/2018	Ozone PM 2.5 PM 10	26 ppb 279 ug/m ³ 344 ug/m ³	24 330 195	Hazardous
11/10/2018	Ozone PM 2.5 PM 10	29 ppb 246.8 ug/m ³ 292 ug/m ³	27 296 169	Very Unhealthy
11/11/2018	Ozone PM 2.5 PM 10	34 ppb 34.3 ug/m ³ 64 u/m ³	31 98 55	Moderate
11/12/2018	Ozone PM 2.5 PM 10	15 ppb 125 ug/m ³ 174 ug/m ³	14 187 110	Unhealthy
11/13/2018	Ozone PM 2.5 PM 10	3 ppb 120.6 ug/m ³ 178 mg/m ³	3 185 112	Unhealthy
11/14/2018	Ozone PM 2.5 PM 10	12 ppb 201.2 ug/m ³ 251 ug/m ³	11 251 149	Very Unhealthy
11/15/2018	Ozone PM 2.5 PM 10	8 ppb 306.2 ug/m ³ 361 ug/m ³	7 356 210	Hazardous
11/16/2018	Ozone PM 2.5 PM 10	19 ppb 417 ug/m ³ 478 ug/m ³	18 445 367	Hazardous
11/17/2018	Ozone PM 2.5 PM 10	17 ppb 190 ug/m ³ 230 ug/m ³	16 240 138	Very Unhealthy

11/18/2018	Ozone PM 2.5 PM 10	28 ppb 143.1 ug/m³ 175 ug/m ³	26 196 111	Unhealthy
11/19/2018	Ozone PM 2.5 PM 10	19 ppb 61 ug/m³ 100 ug/m ³	18 154 73	Unhealthy
11/20/2018	Ozone PM 2.5 PM 10	29 ppb 93.2 ug/m³ 139 ug/m ³	27 170 93	Unhealthy
11/21/2018	Ozone PM 2.5 PM 10	25 ppb 39.3 ug/m³ 54 ug/m ³	23 110 50	Unhealthy for Sensitive Groups
11/22/2018	Ozone PM 2.5 PM 10	29 ppb 2.8 ug/m ³ 54 ug/m³	27 12 50	Good
11/23/2018	Ozone PM 2.5 PM 10	27 ppb 3 ug/m ³ 5 ug/m ³	25 13 5	Good
11/24/2018	Ozone PM 2.5 PM 10	28 ppb 6.5 ug/m ³ 12 ug/ m ³	26 27 11	Good
11/25/2018	Ozone PM 2.5 PM 10	18 ppb 10.2 ug/m³ 17 ug/m ³	17 43 16	Good

*ug/m³ – microgram per cubic meter

*ppb – parts per billion

<https://gispub.epa.gov/airnow/>

During the Camp Fire (11/8/18 to 11/25/18), the offending pollutant was PM 2.5. Finer particles pose a greater risk to health because these particles can penetrate deeper into the lungs and enter the blood stream. In addition, the chemical composition of the finer particles are more toxic. The highest daily average concentration recorded during the Camp Fire for PM 2.5 was 417ug/m³.

As previously mentioned, OSHA does not have a PEL specific to finer particles (PM 2.5). OSHA’s respirable dust PEL includes particles that have an aerodynamic diameter that is equal to or less than 10 micrometers (PM 10). The highest daily average concentration of PM 10 recorded during the Camp Fire was 478 ug/m³ or 0.478 mg/m³, which is approximately 10 times lower than the PEL of 5 mg/m³. It should be noted that comparing the AQI index value and PEL is problematic. Both have different underlying assumptions, (general public health vs. worker health, 24 daily average concentration vs. 8 hours of time weighted average). Furthermore, the last update for the PEL for respirable dust was completed in 1989.

There were 5 days that were considered “Unhealthy”, 3 days that were considered “Very Unhealthy” and 3 days that were considered as “Hazardous”. The air quality started to normalize on November 22, 2018. Following the Petitioner’s request, there would be 11 days in which the employer would have to provide a combination of one or more feasible engineering controls, administrative controls, and respiration protection.

Effect of Small Wildfire Events on the Air Quality in Riverside

In the Riverside area, ozone is the air contaminant of concern. Organic chemicals and nitrogen oxide react and create ozone. There were 3 wildfires (see table below) that may have influenced the air quality in this area. The ozone levels reported were close to approaching the OSHA PEL limit of 100 ppb or 0.1 ppm. There are currently studies underway to study and understand the impact of wildfire smoke on ozone levels.

Riverside Area Site no. 060658001

Date	Pollutant	Daily Average Concentration	AQI	Category
7/22/2018	Ozone PM 2.5 PM 10	64 ppb 6.2ug/m ³ 32 ug/m ³	80 26 30	Moderate
7/23/2018	Ozone PM 2.5 PM 10	94 ppb 11.1 ug/m ³ 53 ug/m ³	172 46 49	Unhealthy
7/24/2018	Ozone PM 2.5 PM 10	91 ppb 14.7 ug/m ³ 59 ug/m ³	164 56 53	Unhealthy
7/25/2018	Ozone PM 2.5 PM 10	91 ppb 20.4 ug/m ³ 61 ug/m ³	164 68 54	Unhealthy
7/26/2018	Ozone PM 2.5 PM 10	80 ppb 19.1 ug/m ³ 59 mg/m ³	133 66 53	Unhealthy for Sensitive Groups
7/27/2018	Ozone PM 2.5 PM 10	97 ppb 18.6 ug/m ³ 54 ug/m ³	179 65 50	Unhealthy
7/27/2018	Ozone PM 2.5 PM 10	97 ppb 18.6 ug/m ³ 54 ug/m ³	179 65 50	Unhealthy

ug/m³ – micrograms per cubic meter
 ppb –parts per million

<https://gispub.epa.gov/airnow/>

Wildfire Events Near Riverside Area Site no. 060658001

Fire	Date	Details
Box Fire	7/6/2018 to 7/12/2018	Burned 100 acres; started on Hwy 15 and Kenwood, North of San Bernardino.
Gray Fire	7/13/18 to 7/15/2018	Burned 12 acres; started in Muscoy, community west of 215 Freeway.
Valley Fire	7/6/2018 to 10/22/18	Burned 1,350 acres; started near the intersection of Hwy 38 and Valley of Fall Drive outside the community of Forest Falls, California.

Pollutant-Specific Sub-indices and Cautionary Statements for Guidance on Air Quality Index Compared to Cal/OSHA Permissible Exposure Limits (PELs)

AQI Categories (Index Values)	Ozone (ppm)		Particulate Matter ($\mu\text{g}/\text{m}^3$)		Carbon Monoxide (ppm) [8-hour]	Sulfur Dioxide (ppb) [1-hour]	Nitrogen Dioxide (ppb) [1-hour] STEL: 1,000 ppb (15 min)
	[8-hour] PEL 0.1 ppm	[1-hour]	PM _{2.5} [24-hour]	PM ₁₀ [24-hour] Respirable dust <10 μm PEL: 5,000 $\mu\text{g}/\text{m}^3$ (8hr)	PEL: 25 ppm (8 hr)	PEL: 2,000 ppb (8 hr)	
Good (Up to 50)	0 - 0.054 None		0 – 12.0 None	0 - 54 None	0 – 4.4 None	0 - 35 None	0 - 53 None
Moderate (51 - 100)	0.055 - 0.070		12.1 – 35.4	55 – 154	4.5 – 9.4	36 - 75	54 - 100
	Unusually sensitive people should consider reducing prolonged or heavy		Unusually sensitive people should consider reducing prolonged or heavy exertion.		None	None	Unusually sensitive individuals should consider limiting prolonged exertion especially near busy roads.
Unhealthy for Sensitive Groups (101 - 150)	0.071 - 0.085	0.125 - 0.164	35.5 – 55.4	155 – 254	9.5 – 12.4	76 - 185	101 - 360
	People with lung disease (such as asthma), children, older adults, people who are active outdoors (including outdoor workers), people with certain genetic variants, and people with diets limited in certain nutrients should reduce prolonged or heavy outdoor exertion.		People with heart or lung disease, older adults, children, and people of lower socioeconomic status should reduce prolonged or heavy exertion.		People with heart disease, such as angina, should limit heavy exertion and avoid sources of CO, such as heavy traffic.	People with asthma should consider limiting outdoor exertion.	People with asthma, children and older adults should limit prolonged exertion especially near busy roads.

Unhealthy (151 - 200)	Ozone – 8hr 0.086 - 0.105	Ozone – 1hr 0.165 - 0.204	Particulates 55.5 – 150.4	255 – 354	12.5 – 15.4	186 – 304	361 - 649
	People with lung disease (such as asthma), children, older adults, people who are active outdoors (including outdoor workers), people with certain genetic variants, and people with diets limited in certain nutrients should avoid prolonged or heavy outdoor exertion; everyone else should reduce prolonged or heavy outdoor exertion.	People with heart or lung disease, older adults, children, and people of lower socioeconomic status should avoid prolonged or heavy exertion; everyone else should reduce prolonged or heavy exertion.			People with heart disease, such as angina, should limit moderate exertion and avoid sources of CO, such as heavy traffic.	Children, people with asthma, or other lung diseases, should limit outdoor exertion.	People with asthma, children and older adults should avoid prolonged exertion near roadways; everyone else should limit prolonged exertion especially near busy roads.
Very Unhealthy (201 - 300)	0.106 - 0.200	0.205 - 0.404	150.5 – 250.4	355 – 424	15.5 – 30.4	305 – 604 [24-hour]	650 - 1249
	People with lung disease (such as asthma), children, older adults, people who are active outdoors (including outdoor workers), people with certain genetic variants, and people with diets limited in certain nutrients should avoid all outdoor exertion; everyone else should reduce outdoor exertion.	People with heart or lung disease, older adults, children, and people of lower socioeconomic status should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.			People with heart disease, such as angina, should avoid exertion and sources of CO, such as heavy traffic.	Children, people with asthma, or other lung diseases should avoid outdoor exertion; everyone else should reduce outdoor exertion.	People with asthma, children and older adults should avoid all outdoor exertion; everyone else should avoid prolonged exertion especially near busy roads.
Hazardous (301 - 500)	-	0.405 - 0.604	250.5 – 500.4	425 – 604	30.5 – 50.4	605 – 1004 [24-hour]	1250 - 2049
	Everyone should avoid all outdoor exertion.	Everyone should avoid all physical activity outdoors; heart or lung disease, older adults, children, and people of lower socioeconomic status should remain indoors and keep activity levels low.			People with heart disease, such as angina, should avoid exertion and sources of CO, such as heavy traffic; everyone else should limit heavy exertion.	Children, people with asthma, or other lung diseases, should remain indoors; everyone else should avoid outdoor exertion.	People with asthma, children and older adults should remain indoors; everyone else should avoid all outdoor exertion.

*Table is from Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI)

Smoke

Wildfire smoke contains:

- carbon dioxide
- water vapor
- carbon monoxide
- crystalline silica
- formaldehyde
- acrolein
- polyaromatic hydrocarbons
- benzene
- sulfur dioxide
- intermediate chemicals
- particle matter (PM), namely small particulates suspended in air, which include particles with diameters less than 2.5 micrometers (PM 2.5) and 10 micrometers (PM 10). However, about 80% to 90% of mass particulate matter produced by wildland fire is within the fine particles (PM 2.5) range with high black carbon, organic carbon and brown carbon contents.

Health Effects of Wildfire Smoke Exposure

Environmental Health Perspectives journal published an article to assess the evidence of health effects from exposure to wildfire smoke and to identify susceptible populations. Researchers sifted through 778 journals in PubMed and 1,248 journal articles in the Web of Science in 2013. Ultimately, 43 epidemiological studies that were deemed by the researchers as having low to moderate potential bias were reviewed.

The 43 studies reviewed showed consistent evidence of associations between wildfire smoke respiratory morbidity in general (respiratory emergency visits, physicians visits, declines in lung function among children), and specifically for exacerbations of asthma and chronic obstructive pulmonary disease (COPD).

*Critical Review of Health Impacts of Wildfire Smoke by Colleen E. Reid, Michael Brauer, Fay H Johnston, Michael Jerrett, John R. Balms, and Catherine T. Elliot, published on April 15, 2016 by Environmental Health Perspectives.

OCCUPATIONAL HEALTH

Permissible Exposure Limits (PELs), Short-Term Exposure Limits (STELs), and Ceiling

Occupational health is concerned with the health of workers, not the overall population. Permissible exposure limits (PELs) are the legal limits for employee exposure to a chemical or physical agent (noise). PELs are established by Fed OSHA and Cal/OSHA. Cal/OSHA PELs for certain chemicals may be lower than Fed OSHA PELs. The intent of PELs are to set limits for airborne contaminants to which nearly all workers may be exposed to daily during a 40-hour

workweek for a working lifetime without adverse effect. PELs are based on a daily exposure, typically a time weighted average of 8 hours. Short term exposure limits (STELs) are for 15 minutes exposures during a single work shift.

Some chemicals have “acceptable ceiling concentrations”, which means an employee's exposure to a substance shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the substance, except for a time period, and up to a concentration not exceeding the maximum duration and concentration. Example from 29 CFR 1910.1000 (b)(3), during an 8-hour work shift, an employee may be exposed to a concentration of Substance A (with a 10 ppm TWA, 25 ppm ceiling and 50 ppm peak) above 25 ppm (but never above 50 ppm) only for a maximum period of 10 minutes. Such exposure must be compensated by exposures to concentrations less than 10 ppm so that the cumulative exposure for the entire 8-hour work shift does not exceed a weighted average of 10 ppm.

Relevant Standards

Federal Standards

- 29 CFR 1910.134 – Respiratory Protection
- 29 CFR 1910.1000 – Air contaminants
- 29 CFR 1910.1000 – Table Z-1 – Table Z-1 Limits for Air Contaminants

California Standards

General Industry Safety Orders

- **Section 3203. Injury and Illness Prevention Program (IIPP).**
IIPP requires employers to identify and evaluate work hazards and develop methods and procedures to correct unsafe or unhealthy work conditions.
- **Section 5140. Definitions.**
Section contains the definition of “harmful exposure”, which is defined as an exposure to dusts, fumes, mists, vapors, or gases:
(a) In excess of any permissible limit prescribed by Section 5155; or
(b) Of such a nature by inhalation as to result in, or have a probability to result in, injury, illness, disease, impairment, or loss of function.
- **Section 5155. Airborne Contaminants.**
Section contains a list of concentration limits of airborne contaminants (PELs) that workers may be exposed to daily during a 40-hour workweek for a working lifetime without adverse effect. Employers are required to conduct exposure monitoring whenever it is reasonable to suspect that employees may be exposed to concentrations above the limits. If monitoring results reveal that the employee exposure is at or above the allowable limits, employers are required to institute control measures in accordance with Section 5141.
- **Section 5141. Control of Harmful Exposures to Employees.**
Section establishes the hierarchy of controls: engineering, administrative, and respiratory protection.

- **Section 5144. Respiratory Protection.**
Section contains the requirements for establishing a respiratory protection program.

Construction Safety Orders

- **Section 1509. Injury and Illness Prevention Program.**
Section requires employers to develop an IIPP in accordance with Section 3203(a).
- **Section 1510(c). Safety Instructions for Employees.**
Section requires employers to provide procedures for protecting employees from known jobsite hazards.
- **Section 1528. General.**
Section requires employers to prevent harmful exposure to employees by removing the employees from exposure to the hazard, by limiting the daily exposure of employees to the hazard, or by application of engineering controls. Whenever such controls are not practicable or fail to achieve full compliance, respiratory protective equipment shall be provided as prescribed in Section 1531, which refers the reader to Section 5144.

Other Standards, Guidelines, Codes

No consensus standards

<https://content.statefundca.com/news/FeatureArticles2013/061913-WildfireSmokeMain.asp>

<https://www.dir.ca.gov/dosh/wildfire/Worker-Protection-from-Wildfire-Smoke.html>

<https://www.cdc.gov/disasters/wildfires/smoke.html>

The guidance documents published on the Cal/OSHA website ask employers to identify and evaluate workplace conditions by:

- Referring employers to outdoor AQI posted at the EPA's website airnow.gov.
- Asking employers to consider the duration of time that employees will be working outdoors and the level of physical exertion.
- Asking employers to be aware of acute health symptoms due to wildfire smoke and consider known pre-existing medical conditions of employees.
- Asking employers to institute controls if the airborne exposure is harmful. Harmful exposure is defined as exposure to dusts, fumes, mists, vapors, or gases in excess of any permissible limit prescribed by Section 5155; or of such a nature by inhalation as to result in, or have a probability to result in, injury, illness, disease, impairment, or loss of function.

Employers are asked to consider implementing feasible controls:

- Engineering: Provide enclosed structure where air is filtered.
- Administrative: Change the work locations or work schedules to minimize exposure.
- Respiratory Protection: Filtering face piece respirators, half-masks or full face.

RULEMAKING PROCESS

Emergency Rulemaking Process

https://oal.ca.gov/regulations/emergency_regulations/emergency_regulation_process/

<https://oal.ca.gov/wp-content/uploads/sites/166/2018/11/Emergency-Rulemaking-Flowchart-New-for-2018.pdf>

The emergency rulemaking process generally includes a brief public notice period, a brief public comment period, review by Office of Administrative Law and an Office of Administrative Law decision. In addition, some agencies have requirements related to emergency rulemakings that are unique to that particular agency.

An “emergency” means a situation that calls for immediate action to avoid serious harm to the public peace, health, safety, or general welfare. (Government Code Section 11342.545.) In order for an emergency regulation to be approved, an emergency situation must be shown to exist.

Unless a situation is expressly deemed in statute to meet the emergency standard, an agency must make a finding of emergency by describing specific facts supported by substantial evidence that demonstrate the existence of an emergency and the need for immediate adoption of the proposed regulation. In addition, if the emergency existed and was known by the agency in sufficient time to have been addressed through nonemergency regulations, the finding of emergency shall include facts explaining the failure to address the situation through nonemergency regulations. A finding of emergency based only upon expediency, convenience, best interest, general public need, or speculation, is not adequate to demonstrate the existence of an emergency. (Government Code Section 11346.1(b)(2).)

Position of Division

The Division submitted their evaluation on February 8, 2019 with a recommendation to GRANT the Petitioner’s request and for the Division to undertake emergency rulemaking to develop emergency regulations to protect outdoor employees from wildfire smoke. After the emergency rules are in place, the Division will proceed with developing permanent rules using the standard rulemaking process.

It should be noted that while the Petitioner is asking for a regulation that is triggered when the Air Quality Index (AQI) value reach the “Unhealthy” category due to wildfire smoke, the Division interpreted the Petitioner’s request to mean as the “Unhealthy” AQI value for PM 2.5, without consideration of the AQI values of other pollutants.

Analysis

The primary industries that are affected by the Petition include Agriculture, Construction, Utilities engaged in non-emergency power restoration, Landscaping, Maintenance, and Commercial Delivery. In 2018 there were wildfire incidents from February to November, but

the peak months were from July to November. The number of employees that will be affected if this petition is granted would be significant.

Wildfires affect air quality by releasing air contaminants that are byproducts of combustion. Inhalation of smoke can cause health effects, particularly to the vulnerable population, who are the very young and old and people with pre-existing respiratory conditions. To address the health hazard, the Petitioner is proposing to use AQI as a means of identifying and evaluating the hazards. An AQI reading of "Unhealthy" is proposed to trigger feasible control measures such as engineering controls, administrative controls, and respiratory protection.

Hazard assessments and control of air contaminants is not new to the occupational health field. Typically the air pollutants that are generated and controlled are man-made, created during the performance of a job or task. The model for controlling air contaminants in the workplace is identification, evaluation and feasible controls. For outdoor work, if the source of the contaminant is generated by the environment, depending on the severity, the available controls are limited.

Identification

- Identify the air contaminants up to the individual chemical components.
- Identify the cause or source of the air contaminants.
- Review the processes where workers are exposed and develop a sampling strategy.

Evaluation

- Conduct air monitoring to determine the levels and characterize exposures. The employer relies on industrial hygiene air sampling data prior to selecting and implementing controls. The presence of workplace airborne contaminants is determined by individuals trained to collect, document and interpret the data. The collection of airborne contaminants is performed according to OSHA or National Institute of Occupational Safety and Health (NIOSH) approved methods and analyzed by an accredited laboratory.
- Review and analyze the results.
- Compare the results with published Permissible Exposure Limits (PELs), Short Term Exposure Limits (STELs), and non-regulatory Threshold Limit Values (TLV). TLVs are published by the American Conference of Governmental Industrial Hygienists (ACGIH).

Controls

If the air-monitoring results indicate an exposure at or above the PELs or STELs then employers are legally required to institute controls. A proactive employer will institute controls if monitoring results approach the TLVs. The hierarchy of controls are as follows:

- Elimination: physically remove the hazard.
- Substitution: replace the chemical agent with something safer.
- Engineering: isolate the employee or remove the hazardous substance through air ventilation.
- Administrative: change in procedure, schedule, and/or provide training.

- Respiratory Protection: filter out the contaminants or provide clean air through a respirator. Respiratory protection has multiple required elements detailed in Section 5144. Respirators have to be carefully selected to ensure that the respirator is appropriate for the contaminant of concern and the respirator provides the desired decrease in the concentration (Protection Factor).

In the event of a wildfire, it may not be feasible to follow all the requirements of the respiratory protection program such as medical evaluation and respiratory fit testing of all of the employees who will wear a respirator. Disposable N95, P100 respirators or filtering face-pieces designed to filter out particulates are the typical respirators used by the public during wildfire events. There are also N95 with organic vapor filter to filter particulates and nuisance level organics (concentrations below the PEL). Filtering face-pieces can be purchased from hardware or home improvement stores. They are more comfortable, easier to use and have less breathing resistance than a half mask tight fitting air purifying respirator. Nevertheless, filtering face pieces can cause a respiratory burden. There may be a small group of employees with pre-existing medical conditions wherein it may not be advisable for them to wear a respirator.

The AQI is a public health tool intended to inform the public of air pollution levels so that individuals can make their own decisions on how to protect their own personal health and the health of their family when engaged in outdoor activities. The AQI is not intended to be an indicator for triggering mandatory occupational health controls.

The criteria pollutants: ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide are also regulated by OSHA and Cal/OSHA. These air contaminants have their respective PELs or STEL. The criteria levels for the AQI category of "Unhealthy" are significantly below the Cal/OSHA PELs for respirable dust, carbon monoxide, sulfur dioxide, and nitrogen dioxide, except for ozone. Although there is no Cal/OSHA PEL for PM 2.5, PM 10 includes particles that have an aerodynamic diameter of 2.5 micrometers. To require employers to establish engineering, administrative, and respiratory protections at levels below the PELs would contradict established regulations, industrial hygiene protocols, the use of established PELs, STELs and TLVs as thresholds for establishing controls.

In addition, if AQI readings were used to show an over exposure to ozone, the AQI results may present an enforcement challenge. Cal/OSHA compliance officers do not have access to the monitoring station's equipment used by the EPA in order to verify the calibration and accuracy of the results reported. This is not to say that the EPA stationary reference monitors are not accurate and reliable. The current model for enforcement of Title 8 PELs require personal exposure monitoring using of sampling methods that are either OSHA or NIOSH approved. Equipment used for enforcement purposes must be calibrated. Air monitoring samples are required to be analyzed by an accredited laboratory to substantiate an overexposure.

Air pollution levels measured at a particular monitoring site are not necessarily representative of the worksite. Atmospheric contaminants behave differently during different times in the

day, different days of the week, etc. The patterns change due to local meteorological and microclimatological conditions.

During wildfire events, current and forecasted AQI information can be used by employers to further evaluate and decide a course of action to protect their employees as required under California's Injury and Illness Prevention Program (IIPP) requirements.

Cal/OSHA, State Fund, and Centers for Disease Control (CDC) currently offer guidance for protecting workers from wildfire smoke. Employers may use this published information to tailor and augment their workplace IIPP.

STAFF RECOMMENDATION

Air pollution is hazardous to human health whether it be man-made or caused by nature. Wildfires exacerbate existing air pollution in urban areas and cause air pollution in areas with relatively clean air. Board staff acknowledges the health effects of wildfire smoke, however the Petitioner's proposed method of addressing the hazards has inherent flaws:

- The criteria and indices for limiting exposure for public health and occupational health differ (AQIs vs TLVs, PEL, STELs).
- The availability of monitoring stations and the ability for the Division to verify the chain of custody of air sampling results, calibration of sampling instrumentation, laboratory accreditation and use of OSHA-NIOSH sampling methods.
- "Unhealthy" air is inherently more prevalent in urban areas than agriculture farm areas.
- The proposal does not consider the impact of the proposed rules on counties/areas with the EPA Status of "Nonattainment" for criteria pollutants ozone and PM 2.5
- Impediments in determining the AQI for a specific worksite.
- Consistency of enforcement in determining feasible controls.
- Employer compliance challenges relating to having readily available and accurate site specific AQI.

Board staff recommends that the Petition for a regulation requiring employers to institute feasible controls: engineering, administrative, and respiratory protection when the AQI readings are considered "Unhealthy" be DENIED.

However, Board staff recommends gathering a panel of experts to discuss the hazards and available information to develop a strategy to protect employees who work outdoors from wildfire smoke or other hazards associated with wildfires.

- Consider the use of the emergency standard rulemaking process called "super emergency" action. The "super emergency" action would be associated with a triggering event (specific wildfire event) to limit the scope and the days the proposed rules would be in effect.
- Aside from the AQI, should the size of the wildfire event be considered for triggering controls?

- If Daily AQI were used to trigger controls, which AQI category is appropriate for occupational health? Certain regions of California reach the AQI “Unhealthy” category even in the absence of an active wildfire.
- Review of the Historical Data for the AQI triggering category to understand the scope: number of days controls are expected to be instituted, acreage of area affected, if data is available the number of employees that will be affected.
- Is there an AQI category that would require employers to curtail or stop work? If work is curtailed or stopped, will the employer be required to pay the employees for lost wages?
- Accuracy of the AQI forecast.
- How many days in advance can AQI forecast?
- What are acceptable “feasible” controls? Will it vary by industry?
- Discussion on “feasible” vs. “practicable” controls.
- Since one of the engineering controls available to outdoor workers is to seek respite indoors, new ventilation rules regarding limiting the volume of make up or outside air intake and increasing the efficiency of the filters should be considered.
- Legal consideration of handling employees with known or unknown pre-existing medical conditions.
- How should AQI be reconciled with existing PELs for enforcement? Will PELs be temporarily suspended in favor of AQI during a triggering event?