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**Minutes of
Twelfth Meeting of the Health Effects Advisory Committee (HEAC)
for Permissible Exposure Limits for Airborne Contaminants in the
Workplace
California Code of Regulations, Title 8, Section 5155
December 3, 2019
Elihu Harris State Building, 1515 Clay Street, Oakland, California**

Division of Occupational Safety & Health

Panel: Garrett Keating, Chris Kirkham

Notes: Keummi Park, Kevin Graulich

HEAC Members Present

Michael Bates, PhD, UC Berkley School of Public Health (Epidemiology)

Eric N. Brown, Dr PH, CIH, CSP, SCS Engineers (Industrial Hygiene)

Michael N. Cooper, MS, MPH, CIH, Principal Scientist, Mcooperconsulting LLC, Eagle ID.
(Industrial Hygiene)

William Forest, MPH (Epidemiology/Toxicology)

Patrick Owens, MSPH, CIH, Shell Oil Martinez Refinery (Industrial Hygiene)

Public and Interested Parties

Dan Leacox, Leacox and Associates

Bob Nocco, Chevron

Kashyap Thakore, California Department of Public Health, HESIS

Kristin Cummings, California Department of Public Health, HESIS

Loren Scott, American Chemistry Council

Michael Horowitz

Kim Hudson, Associated General Contractors of California

Bob Ford, CDPR

Emma Colson, CDPR

David Kernzitskas, Standards Board

Mary Deems, California Department of Public Health, HESIS

Abraham Parra, Bluewater Environmental

Below are detailed notes of the advisory meeting. These notes do not represent a transcript of the meeting, and are simply a summary of the notes taken by the people conducting the meeting.

Garrett Keating and **Chris Kirkham** opened the meeting. **Kirkham** introduced the committee members and staff, covered housekeeping items, and explained the agenda and handouts. **Keating** further explained the agenda items and the plan for the meeting. Keating acknowledged that several committee members were not able to make it today, so the two substances that were up for a second review will be brought back for a third review to give the absent members the opportunity to comment.

Michael Cooper asked for a status update on the formal rulemaking for the substances

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previously passed through committee. **Keating** stated that that topic would be pushed to the afternoon session under “other business.”

Benzophenone – Second Review

Keating introduced the summary sheet on benzophenone (BZP) and the current recommendation of 0.25 ppm. He recalled that at the last meeting, some questions were raised about its potential inhalation exposure since it is not particularly volatile. In response, he prepared an overhead to present data and the derivation of the proposed PEL. **Keating** also indicated that the dermal route seems to contribute more than inhalation.

Cooper asked about the redacted number on the PowerPoint. **Keating and Cooper** inferred that the number would be <1. **Michael Bates** asked why the number was redacted, and **Keating** indicated that he did not know; possibly it was proprietary information as this was from a REACH dossier.

Keating continued with the presentation. He reiterated that major exposure is through the dermal route. He said BZP is a common ingredient in cosmetics and sunscreen products as well as paints and surface coatings. He stated it is difficult to find inhalation exposure data, and that data supports a skin notation as well. He opened the discussion for committee comments.

Bates pointed out that on page 11 it states that the rat tumor kidney data did not statistically support a significant dose response trend. He noted that this conclusion was based on a p-value of 0.06 and felt this conclusion is based on an arbitrary method. He recommended that the document report the p-value but not the statement on significance given the closeness of the p-value. **Keating** agreed.

Cooper asked if **Keating** had looked at the WEEL. **Keating**, stated yes, but it didn't provide specific values for individual uncertainty factors that comprise the total uncertainty of 40. He stated that the 2-year chronic study had not yet been completed so the WEEL is based on a sub-chronic study. **Cooper** stated that he believes that the BZP WEEL is being re-evaluated. **Bob Nocco, Chevron**, indicated that he did not think so.

Keating discussed usage data from CERS. He explained that in an attempt to get information on how BZP is being used, Cal/OSHA emailed 20 large BZP users and invited them to the meeting to provide information on usage and impact. He said that it appeared none of them are in attendance at the advisory meeting.

Keating indicated that **Kashyap Thakore, HESIS**, had pointed out that the Michigan study does give a quantitative cancer risk assessment for BZP, that there were multiple cancers (kidney and others), and that the study aggregated the cancer slopes from different endpoints for the risk assessment. **Keating** said he would look at that analysis and see how it compares with the HEAC recommendation. **Keating** also pointed out that this was a feeding study and assumed 100% absorption so he would have to look more closely at that.

Bates commented that he would like to see a paragraph or two to summarize how we get to the recommendation of 0.25 ppm. **Keating** replied that he would review this.

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Nocco asked what the key study is. **Keating** replied that he used the benchmark dose modeling results obtained by the European Food Safety Authority, which was based on the 2006 NTP study, a two-year chronic rat study (page 10). **Nocco** stated that the feeding study may have enzyme induction effects as opposed to an inhalation study and may need to be adjusted. **Keating** agreed to look at this.

Forest stated concern about the second paragraph of the summary regarding the alpha-2 - globulin statement. **Keating** said he would review that.

Patrick Owens was curious about conversions in the exposure scenario table. He said he believes that spray painters would be over the new limit. **Forest** said there are other scenarios where aerosols may be an issue. He explained that these models seem to address re-volatilization from an applied material and seem to ignore the exposure during application. **Mike Horowitz** commented on experience with overspray and bounce-back from spray painting operations causing significant aerosolization and exposure. Several others commented about the higher potential for aerosol exposure. **Keating** stated that he would look into this more and report back at the next meeting.

Kirkham indicated that the document would be updated with the CERS data that shows approximately 120 users. **Cooper** asked if they were large volume users. **Keating** indicated that it was varied.

Turpentine – Second Review

Keating presented the summary. Currently the PEL is 100 ppm and 20 ppm is proposed for discussion. He presented some of the studies used for this recommendation. **Keating** confirmed that NTP is continuing with an alpha-pinene chronic rat study.

Keating presented a handout to discuss the nomenclature for turpentine. He raised analytical questions regarding other terpenes. He explained that analytical method 1551 (turpentine) requires submission of bulk sample with the air samples to define the composition of the turpentine. **Forest** asked if there is an existing state or federal standard that is done this way. **Kirkham** replied that this is a standard NIOSH method.

Nocco stated that our OEL/PEL is being set based on these specific substances, and effects from these compounds, so we can't add in other compounds found in the workplace to reach a PEL. **Forest** indicated that the main issue here is in the definition. He explained that NIOSH is defining turpentine based on what is actually in the mixture being used in the workplace and from a practical, IH viewpoint that makes sense, but we have to look if it makes sense from a standard-setting viewpoint. Much discussion occurred about how to define turpentine, which monoterpenes to include, and whether others should be excluded from the TWA calculation.

Keating indicated that Cal/OSHA will look at this more and come back with a definition that we can work with for our next meeting.

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Sulfur Dioxide – First Review

Keating noted this was the first review for the SO₂ draft summary and presented a PowerPoint presentation reviewing how the asthmatic studies were analyzed to lead to a recommended PEL. The presentation also included a review of the effect of breathing rates on effects in asthmatics.

Cooper asked about the question that HEAC was trying to answer. **Keating** replied that we are looking at effects in asthmatics with relatively high breathing rates and whether those effects at high breathing rates are an appropriate basis for the PEL. **Keating** continued to present the slides from the PowerPoint. **Keating** indicated that the current proposal is a STEL, which is consistent with ACGIH. There was discussion around the slides presented, what the data represents, and if HEAC should be looking at effects on the general population or the most sensitive.

Keating will look at the extrapolation of background breathing rates, check units and labeling of the axis on some of the charts, look at page 25 of the summary to correct negative values (no effect), and look through the calculations that lead to the current recommendation.

Lunch Break

Selection of Priority 1 Substances

Keating introduced the priority 1 list. He indicated that at the last meeting there was support for priority 1 status for all of the substances except 1-bromopropane (1-BP), methanol, and carbon tetrachloride, for which some questions had been raised.

Keating presented a handout for 1-BP to discuss usage data and recent 1-BP toxicology studies. No one raised questions about the toxicology data, so Keating turned the floor over to **Kristin Cummings, HESIS**, to present the usage data.

Cummings presented slides on SB-193 and the authority of HESIS to gather data from manufacturers and distributors for the purpose of determining the extent that a substance is used. She explained that the first substance being reviewed under the law is 1-BP, and that the program was focused on 1-BP containing products that would be used as vapor degreasers, cold cleaners, or spray adhesives. She said that HESIS identified 355 unique end-users/customers (see handout).

Keating stated that authoritative bodies have reduced their OEL by a factor of 10, so that, along with usage, justifies a reevaluation of 1-BP. **Eric Brown** supports keeping it on the list. **Keating** proposed using a working group to look further into 1-BP.

Dan Lecox, Lecox and Associates, asked how HESIS decided to address 1-BP first. **Cummings** replied that a number of factors were considered in the process, including newly identified hazards. She explained for 1-BP, it was identification as a carcinogen and severity of neurotoxicity. **Thakore** stated that IARC and OEHHA listed 1-BP as a carcinogen and likely use in California was another criteria.

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Cooper indicated that there were several substances that HEAC has not discussed yet that may have more deleterious effects than 1-BP. **Brown** replied that he supported having a working group to look at 1-BP and determine if it should be kept on the list.

Keating moved on to methanol and carbon tetrachloride. He explained that methanol was put forward because EPA and OEHHA listed it as a developmental toxicant and recommended levels from 10 to 60 ppm, and the current Cal/OSHA PEL is 200 ppm. **Brown** noted that ACGIH is still at 200 ppm. **Keating** indicated that he needs to review the data from the new EPA assessment and report back to the committee on whether he feels that it warrants further evaluation.

Keating recommended taking carbon tetrachloride off the P1 list because users in the CERS data were small quantity users. He asked the committee if there are other substances from the OEHHA Occupational Risk Report (list provided as a handout) that they would like to add to the P1 list in place of carbon tetrachloride. There were no objections to removing carbon tetrachloride from the P1 list.

Brown asked about the status of diethylene glycol and phthalic anhydride. **Kirkham** stated that phthalic anhydride is used in counter top manufacturing and Federal OSHA presented at AIHCE a case where several workers were sensitized by the substance.

Cooper commented that some other substances have no PELs and should be looked at first. **Brown** indicated that other endpoints may take precedence so it may be a case by case basis.

Keating stated that he will look at the lists and try to propose a replacement for carbon tetrachloride at next meeting.

Keating stated that he was hoping would look at analytical feasibility of TiO₂ – ultrafine. **Brown** proposed the next few in line of evaluation be: 1) diethylene glycol monobutyl ether, 2) monochloroacetic acid, and 3) PCBTF.

Owens asked about the under review statement on the PCBTF cancer assessment. **Thakore** replied that the final draft is under consideration for the cancer endpoint and is expected that IARC will be considering it toward the end of the year.

Establishment of HEAC Working Groups

Keating proposed that HEAC set up working groups and explained the intent. The committee generally approved of the idea. **Keating** indicated that he would be reaching out to members directly to assemble these working groups since there are so many missing today and this would be a voluntary task.

Other Business

Keating summarized the meeting with the following task list items:

1. Work on toxicological discussion of benzophenone based on several good questions that were raised. Look at exposure models and Questions about spray vs. roller application of paints that could impact exposure (Owens and Cooper indicated that the

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- exposure route should not affect the evaluation of the limit).
2. Work on definition and evaluation of monitoring methods for turpentine.
 3. Review questions regarding SO₂ and ask committee members to review and submit comments and questions for discussion at the next meeting.

Kirkham mentioned that since the last meeting, Cal/OSHA had posted a listing of the status of formal rulemaking packages on the HEAC website. For TCE, Cal/OSHA is waiting on a National Academy of Sciences review that is due out soon, to determine if cost/OSHA will go forward with the proposal previously submitted or will make revisions prior to re-submission to the Standards Board.

Kirkham acknowledged that James Unmack had retired from the committee due to health reasons, and wanted to thank him for all the work and effort that he put into the committee. **Cooper** wanted to further acknowledge that Unmack had been on the committee for many years and contributed to numerous projects. **Cooper** proposed some more formal statement to show the committee appreciation for his efforts.

Keating asked if there were any additional comments. None heard.

Meeting adjourned.