

Meeting Minutes

Air Toxics Science Advisory Committee Meeting No. 10

Oct. 21, 2015 (9 am to Noon, PDT)
Conference Room EQC-A, 10th Floor, DEQ HQ
811 S.W. Sixth Avenue
Portland, Oregon 97204

List of Attendees

Committee members present: Bill Lambert, Dean Atkinson, Kent Norville, David Farrer, Bruce Hope, Dave Stone, Max Hueftle.

Oregon Department of Environmental Quality (typically referred to as DEQ) staff present: Sue MacMillan (Air Toxics Science Advisory Committee lead), Sarah Armitage, Chris Swab, Anthony Barnack.

Introduction

Bill Lambert welcomed everyone and stated that this meeting was the tenth meeting of the Air Toxics Science Advisory Committee (ATSAC) meeting for the session that began in December 2014. He then asked if the committee had had a chance to review prior meeting minutes, and said he had seen some comments from Bruce Hope and Max Hueftle. The committee agreed to approve the September 2015 meeting minutes. Bill Lambert then asked if there were other administrative matters to discuss.

Sue MacMillan explained that the July ATSAC meeting minutes are out for review by the committee. Two or three committee members provided her with comments so far, so she is waiting for more comments before she finalizes the July minutes. She asked the committee if more comments were coming. She stated that the June meeting minutes would go out to the committee shortly for their review.

Status of diesel particulate matter benchmark memorandum

Bill Lambert stated that at the last ATSAC meeting, the committee spent considerable time discussing alternative approaches for developing a benchmark concentration or ABC for diesel particulate matter (typically referred to as DPM). The committee reached consensus that they would rely upon the available epidemiologic data to try to come up with an estimated URE from the literature, and not include animal studies. Bill said that he was still working on the draft DPM memo that he volunteered at the September ATSAC meeting to attempt. He wanted to discuss the approach that he is taking for this, and provided handouts to the committee on this topic.

The committee wants to consider coming up with a defensible approach to identifying the principle studies that we'd rely upon to take an average or a mean of to estimate or approximate what the DPM concentration, specifically elemental carbon as a surrogate, should be for a standard. We will be extrapolating from the available occupational studies of miners, long-haul truck drivers and others; we have essentially a list of a large number of studies, some from the 1980s and 1990s. He feels this list is complete because the studies being relied upon were developed by the U.S. EPA and California's Office of Health Hazard Environmental Assessment, more commonly referred to as OEHHA; and he is performing additional literature searches to supplement the agencies' information. Sue MacMillan had also assembled a list of relevant



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studies. So, from this larger group, we chose principle studies based on the quality of the study design, measurement of exposure, the outcomes considered, the way the study was conducted and if it's possible to come up with, a quantifiable dose-response number.

No one in the literature has really provided this kind of justification before in regard to the choice of studies to be considered. There are issues related to controlling for other exposure variables that also are determinants of lung cancers, such as smoking, exposure to radon, and the healthy worker effect, which alludes to the idea that a man who is healthy enough to work has a greater chance of surviving exposure to chemicals in the workplace. To varying degrees, these studies have controlled for these effects. The length of follow-up evaluation in these studies varies from a few years to decades or more.

We can create a spreadsheet that reflects the information from all of these studies, which should assist the committee in deciding which studies they consider relevant, and which they do not, based on the attributes we've been describing. Then we can take the studies that we select and back-calculate an average, similar to what Bill Lambert described at the September ATSAC meeting in regard to work by Robert Park. We can then use sophisticated boot-strapping methods or simulations to come up with a true 95 percent confidence interval value; which we can then use to identify a defensible best estimate.

Bill Lambert said that he would probably generate a report that is about eight pages long with some tables, along with documentation of the studies that were considered. He will also describe the set of criteria used to identify relevant studies to include. We may be able to perform sensitivity analysis, which to some degree has been done in the papers that are critical of the Vermeulen study. Sensitivity analysis helps to demonstrate what happens when you use varying groupings of results to come up with a number, and how this process influences this central estimate. This would be a fairly simple approach.

Some of the papers that critique the studies we're interested in are also worth looking at. The committee needs to look at the paper by Kenny Crump, 1991, and the one by Morfeld and Spalleck, 2015, which Bill Lambert distributed at the September ATSAC meeting to help the committee judge whether or not the approach will really stand up to these critiques.

At this point, it appears that five studies by Silverman, Attfield, Garshick, and Steenland seem to be of the highest quality, and are also the ones that we can relate to elemental carbon. The other studies are more qualitative in their assessment of exposure, and do not appear to provide a credible measurement of what the diesel exhaust exposure received in those studies actually was. This committee needs quantifiable numbers to be able to move forward.

Bill Lambert is following this protocol because he is highly uncomfortable with just recommending a numeric standard for DPM without providing clear justification for how the number was calculated. The lack of clear justification in regard to the OEHHA approach and the related lack of transparency in regard to how the OEHHA calculated their number is what several of us on this committee have been uncomfortable with, and we don't want to repeat these weaknesses with our own calculations. This process has turned out to be more complex than Bill Lambert thought.

White phosphorus

Bruce Hope presented toxicity information on white phosphorus first, followed by toxicity information for hydrogen sulfide. Bruce Hope stated that back in 2005, the ATSAC had chosen a value for white phosphorus that California had put out at that time. Since then California has withdrawn that value. EPA does not have an inhalation value for white phosphorus. The Agency for Toxic Substances and Disease Registry, commonly referred to as ATSDR, came up with a

value based on respiratory irritation occurring to adults over a period of five minutes. The National Research Council looked at a study based on longer-term exposures in rats.

It's important to know that white phosphorus is actually not used much anymore. Initially it was used to make matches and the military tried to use it to generate smoke, but white phosphorus turned out to be a bad option for generating smoke. So the military switched to using red phosphorus instead. The only current use for white phosphorus is as a weapon. White phosphorus looks like a block of wax, and if it's left out in the air it will volatilize slowly, creating an odor similar to garlic. People exposed to these vapors in industrial settings back at the turn of the last century and the early part of the last century led to the development of a disease called phossy jaw, where the jaw rotted away. But this situation can only occur in industrial settings, because if that block of wax-like white phosphorus sits there a little longer it ignites and then it generates this cloud of smoke made up primarily of phosphorus pentoxide. Phosphorus pentoxide reacts with water in the air to form phosphoric acid. Phosphoric acid is actually an ingredient in Coca Cola. So this committee, basically, is focusing on protecting people from inhalation of white phosphorus smoke and subsequent irritation of the upper respiratory tract.

Based on the rat study evaluated by the National Research Council, the Council came up with a value they called their repeated public exposure guidance level. This level was based on the fact, again, white phosphorus is rarely used outside of an industrial setting. The military is the only organization that ever looked at white phosphorus very closely.

Thus, the number that Bruce Hope is recommending for white phosphorus is 9 micrograms per cubic meter, or $9 \mu\text{g}/\text{m}^3$, which is based on the rat study with a series of uncertainty factors added to protect people from irritation from inhalation of the smoke. Bruce Hope cannot think of a way in which a member of the general public would actually get exposed to white phosphorus smoke, but if they were this protective value would prevent upper respiratory irritation.

Bill Lambert mentioned that there was a production facility in Pocatello, Idaho about 10 years ago that's since been closed and demolished. There was a concern in that area at that time about white phosphorus smoke drifting to the adjacent Indian Reservation of the Shoshone-Bannock Tribe at Fort Hall. White phosphorus was actively used during the Vietnam war for weapons work, as Bruce Hope described.

Bruce Hope asked Chris Swab why white phosphorus was in the emissions inventory, and wondered what source emits in the state of Oregon. Chris Swab then asked Anthony Barnack if white phosphorus is used in fireworks. Anthony Barnack responded that it might be used as a colorant in that capacity. Chris Swab then briefly exited the meeting to go and check his data sources. While he was gone, the committee decided to vote on the proposed value of $9 \mu\text{g}/\text{m}^3$ as an ABC for white phosphorus, as Chris Swab's answer wouldn't have a bearing on picking a value. The recommended value of $9 \mu\text{g}/\text{m}^3$ is a change from the current ABC of $0.07 \mu\text{g}/\text{m}^3$ for white phosphorus.

Hydrogen sulfide

Bruce Hope stated that there's been no change in available toxicity information for hydrogen sulfide. ATSDR did put out a revised value, but it applies only to intermediate, rather than chronic, exposure. Thus, the existing ABC is based on chronic exposure to hydrogen sulfide, and is also much lower (more stringent) than the ATSDR value. Bill Lambert then asked Sue MacMillan to document that fact that there is no new, applicable toxicity information for hydrogen sulfide, and so the current ABC will not be revised.

Hydrogen fluoride and fluorides

Dave Stone and Bruce Hope presented toxicity information on fluorides. Dave Stone said that fluoride needs some explanation because it's referred to in different ways by different people. *Fluorine* is a gas that is exceptionally toxic and reactive. A person would encounter fluorine gas only in an industrial situation, or perhaps through an accident of some kind. Exposure to this gas would almost certainly result in death.

Fluorine, although highly toxic, doesn't exist in the gaseous form for very long. The gas form rapidly combines with water, hydrogen, or methane in the atmosphere to produce *hydrogen fluoride*. It is important to keep track of what type of fluoride is being discussed by using the Chemical Abstracts Service (CAS) numbers, which are specific to each type of chemical. The current ABC is specific to hydrogen fluoride. Hydrogen fluoride can exist as a gas or as *hydrofluoric acid*; in fact, they have the same CAS numbers. There are other types of fluoride compounds, such as fluoride-chlorine compounds. Sodium fluorides are relatively water-soluble, and this form of fluoride is what is released from aluminum filters. Fluorine's toxicity comes from the fact that fluorine displaces calcium in the blood; and calcium is necessary for proper heart action. Thus, the presence of fluorine in the human body causes heart failure and death. However, the compound sulfur hexafluoride is completely inert and does not cause damage, and in fact is used in cataract surgery to seal wounds.

Fluoride exists as an anion, and combines with other ions to form stable compounds, and is present in toothpaste and drinking water; it has its own CAS number. Fluorine, on the other hand, is an element, and as mentioned previously, is highly reactive and toxic. Fluorine is the entity in fluoride compounds that causes toxic responses. As stated earlier, fluorine displaces calcium in the blood, leading to heart problems. It also displaces calcium during bone formation, which leads to one clearly recognized health effect from fluoride, which is skeletal fluorosis, indicating damage to joints and bones. The measurement of fluoride in air is restricted to our ability to measure the fluoride anion. Among all the different fluoride compounds, the only one we can measure is the fluoride anion.

One state program exists which has separate benchmarks for many different fluoride compounds, based on a compound equivalency approach. This is done simply by evaluating the molecular weight ratio of the fluorine (the toxic component) in the compound versus the molecular weight of everything else in the compound. However, this method does not address the fact that many of the compounds for which benchmarks were generated are not soluble, and solubility facilitates the toxic effects. Nor does this method address the fact that in some cases, the reactive gases don't last long enough in air to be a health problem. Thus, it is important to regulate the fluoride anion, because its availability in air is what drives toxic responses.

Hydrogen fluoride makes up about 35% of the fluoride present in the atmosphere on a global basis. If there's water around, then hydrochloric acid tends to form as aqueous hydro fluoride, which exists as an aerosol. It can be "scrubbed" out of the atmosphere by wet deposition --for example, rainfall -- or through dry deposition. The aerosol form lasts about 12 to 14 hours after it's been emitted; so it's not a long-lasting compound, and thus not of much concern.

Twenty-four percent of the fluoride in the atmosphere is actually in the form of fluoride particles. If you were standing next to an operating primary smelter, it would be emitting particles of sodium fluoride. These large particles can condense and dry-deposit out of air onto other media, or can be "scrubbed out" of air if moisture is present. So under dry conditions, these particles last quite a while. But under wet conditions they last only about 50 hours. Because they don't have a long residence time in the atmosphere, they cannot travel very far.

Volcanoes and certain soils are natural sources of hydrogen fluoride. Fluorides are also naturally-occurring compounds. Coal fire and electrical utilities are anthropogenic sources of hydrogen

fluoride. Oregon still has one of these sources in the state, but it is on its way out, and will close soon. Another source of hydrogen fluoride is as emissions from primary aluminum smelters; but Oregon no longer has any of these facilities.

Because fluorides are naturally occurring, there are ambient levels of fluorides present even in isolated areas at a concentration of about 0.05 ug/m^3 . Within most urban areas, the concentration is between 0.01 or 0.005 ug/m^3 and 1 or 2 ug/m^3 . In heavily industrialized areas, the concentration can be present at 2 or 3 ug/m^3 , and in some cases at 7 to 10 ug/m^3 . However, a person gets fluoride in their system primarily from food consumption. For example, if you drink a lot of tea, you're getting a lot of fluoride. The tea plant is one of the few plants that can accumulate fluoride.

There is not any clear epidemiological evidence that fluoride causes cancer. EPA hasn't evaluated fluoride, and the international agency has not classified fluoride as a carcinogen. Although people have asserted that fluoride causes a number of other diseases, there is no clear scientific evidence of that. Thus, the strongest evidence available for health effects relies on studies regarding skeletal fluorosis.

The summary table of fluoride values created by Dave Stone and Bruce Hope was referred to by the committee to discuss the various protective values available for fluoride. All the different sources coalesce on the same value of 13 or 14 ug/m^3 . In three cases, a value of 14 ug/m^3 is applied to hydrogen fluoride, with 13 ug/m^3 of this being attributed to fluorine. The State of Texas recently reassessed the Derryberry et al. (1963) results using a benchmark dose model, and established a chronic effects screening level of 27 ug/m^3 , which is higher (less stringent) than the information from the other agencies discussed above. Dave Stone said he and Bruce Hope are recommending 13 ug/m^3 as the ABC for the fluoride anion, with the related critical effect being skeletal fluorosis. Respiratory and pulmonary issues were also noted.

Bruce Hope added that Washington State has adopted 14 ug/m^3 as its value for fluoride. He found that most regulatory agencies all recognize a value around 13 ug/m^3 for the protection of human health. If we wanted to protect plants and cows, the number would be lower; but those concerns are outside the purview of the ATSAC. He emphasized that many people other than the members of the ATSAC have looked at this issue and settled near the same number. Also, we are choosing to set a benchmark for total fluoride anion in the air, regardless of its source, which will help us have a protective value for nearly any fluoride compound being emitted.

Bill Lambert said that Dale Feik, an audience member, would have a chance to speak on fluorides during the public comment period from 11:45 a.m. to noon today, and Dale Feik has provided lists of fluoride compounds that appear to come from a Citizen's Right to Know information for the Intel facility. Bill Lambert passed the list to other committee members to scan.

Bruce Hope clarified that fluoride anion is an inorganic form of fluoride, but that there are quite a few organic fluoride compounds which are not covered by the ABC that we are recommending for the fluoride anion. Bill Lambert said that the parent compounds are not really what we're interested in, but rather the fluoride anion. Bruce Hope asked if Anthony Barnack could check on exactly which types of fluoride compounds can be measured in air analytically. Nonetheless, Bruce Hope believes that setting an ABC for the fluoride anion will be protective of any other fluoride compound where fluorine contributes a significant amount of toxicity.

With the more complicated fluoride organic compounds, they don't generally show up as inhalation problems unless of course you're in a fire; rather, they tend to be ground water or soil problems, or greenhouse gas problems. In regard to impacts to human health through the inhalation pathway, these chemicals don't appear to be a concern, based on the current state of the science. Bruce Hope also mentioned that the Emissions Inventory report lists fluoride-related

compounds at about 9 tons per year (as related to 30 tons of hydrogen fluoride), emitted via residential wood stove combustion, and predominantly from non-EPA-certified wood stoves.

A committee member pointed out that it's been the committee's policy to round values down to one significant figure, and asked if the committee wanted to round 13 ug/m³ down to 10 ug/m³ on that basis. Bill Lambert reiterated that the recommendation for a new ABC would be 13ug/m³ for the fluoride anion, and discontinue use of the current ABC for hydrogen fluoride alone. Kent Norville asked why the committee was considering rounding down an established protective value of 13 ug/m³, based on being consistent with previously published values as opposed to something that is inherent in the development of the number.

A committee member pointed out that the committee has taken some latitude with their rounding decisions; typically, it's been to the nearest whole number. In the case of lead, we held to the value of 15 ug/m³ without rounding it to be congruent with the National Ambient Air Quality Standard for lead. Bruce Hope stated that a large number of studies support the use of 13 ug/m³, which should perhaps hold more weight than ATSAC policy in this case.

Bill Lambert then asked the committee to vote on 13 ug/m³ as a new ABC value for fluoride anion. He suggested that as another point of discussion, the committee should talk about the rounding rule and its impact overall as policy. The committee should review some concrete examples of rounding decisions that we've made and then have a discussion about consistency and what this so-called rounding rule means for us. So, the recommendation before us is for 13 ug/m³ for the fluoride anion, and to drop the ABC for hydrogen fluoride. The committee voted unanimously to adopt these recommendations: Discard the current ABC for hydrogen fluoride (which is 14 ug/m³) and set a new ABC for the fluoride anion of 13 ug/m³.

Hydrogen cyanide

Max Hueftle and Kent Norville presented toxicity information on hydrogen cyanide. Hydrogen cyanide is a colorless or pale blue liquid or gas above 78 degrees Fahrenheit. Apparently it has a bitter almond-like odor. Hydrogen cyanide is used in gold and silver mining and electroplating of those metals. The relevant epidemiology studies came from these practices: specifically, electroplating workers in Egypt.

Hydrogen cyanide is also present in vehicle exhaust, tobacco smoke, and wood smoke and in fact appears in the Oregon Emission Inventory at fairly high mass amounts. In terms of mass, hydrogen cyanide is 20th highest mass amount emitted, attributed to structural fires and to open burning, including residential open burning. The pits found in some fruits, such as apricots and chokecherries, contain hydrogen cyanide, and if eaten, can cause death in humans. Burning cigarettes and the resulting smoke also contain hydrogen cyanide. Fire fighters face being poisoned, depending on the type of fire they are fighting.

In 2005 the EPA Integrated Risk Information System (or IRIS) number was 3 ug/m³ rather than 0.8 ug/ m³, and at that time the ATSAC chose the OEHHA number of 9 ug/ m³, which is unchanged at this point; we chose it basically because it was the more recent of the two reviews of the data in 2005.

Since then, EPA has gone back and taken another look at the number. Thus, both IRIS and OEHHA have now based their numbers on the exact same study, which looked at thyroid effects and iodine uptake from 36 male workers at three the Egyptian electroplating facilities. Their exposure was anywhere from three to five years, so this is kind of a sub-chronic timeframe, although one person was exposed for up to 15 years. The resulting number from this study identified a NOAEL of 7.1 milligrams per cubic meter, which became the point of departure for both the IRIS and OEHHA studies, but the two agencies applied different total uncertainty factors

of 3,000 and 300, respectively. So the question is: Do the issues that EPA raised in using a larger uncertainty factor warrant a reconsideration of the benchmark?

A lengthy and complex discussion of the reasons for each uncertainty factor ensued, including discussion of hydrogen cyanide effects on pregnant women; evidence that subclinical hyper thyroid rates cause deficits in offspring; the fact that cyanide causes a deficit in thyroid function, and a deficit in thyroid function can lead to health outcomes, *ipso facto* cyanide becomes the link to adverse health outcomes; the fact that the point of departure is based on impacts to healthy male workers rather than pregnant women; and that the ATSAC committee is charged with protection of vulnerable sub-groups, which would include women and fetuses; the possibility that the hypothyroidism induced by hydrogen cyanide exposure may be a different “flavor” than the hypothyroidism that these other studies are based upon; which may be related to endocrine disruption.

Bruce Hope said that all of this conversation boils down to either retaining our current ABC for hydrogen cyanide or accepting EPA’s somewhat generous additional uncertainty factor of 10. Use of the additional uncertainty factor of 10 would account for the uncertainty around known effects to hypothyroidism outcomes and the potential that higher exposure could contribute to those. Bruce Hope suggested that we recommend 0.8 ug/ m³ as the ABC for hydrogen cyanide. Bill Lambert supported that suggestion by pointing out that there’s probably a larger database on the effects of hypothyroidism and intergenerational effects due to hydrogen cyanide than represented here by the three studies we’ve discussed today. The rapidly growing endocrine disruption literature would be expected to contribute additional studies to back up our confidence in this mechanism that would happen during pregnancy and *in utero*. It’s a stronger database than what was available in 2010. This doesn’t warrant changing the uncertainty factor, it just makes the mechanism that we’re most concerned with more plausible.

Bill Lambert reiterated that the recommendation is to revise the current ABC of 9 ug/m³ to 0.8 ug/m³, which would make us consistent with the value from EPA IRIS. A vote was called for, and the recommendation to revise the ABC for hydrogen cyanide to 0.8 ug/m³ got unanimous approval from the committee.

Mercury (elemental)

Dean Atkinson and David Farrer presented toxicity information on elemental mercury. They said that the situation with elemental mercury is very similar to the situation we just discussed in regard to hydrogen cyanide: we have the same endpoints, the same critical study and the same points of departure for two different numbers, but OEHHA added another uncertainty factor of 10 to the mix. But first let’s give some background on mercury, which is a very interesting chemical from a toxicological perspective. In the case of mercury, the route of exposure is important, because mercury exists in many different forms, and each form has a critical route of exposure. So, for elemental mercury and the inhalation pathway, the most toxic component is inhalation of the vapor that comes from elemental mercury. Mercury is neurotoxic, and can damage kidneys and the immune system. Organic forms of mercury, methylmercury in particular, is created when inorganic mercury enters an aquatic environment, where microbes can convert inorganic mercury into organic methylmercury through methylation. Once mercury is methylated, it is able to biomagnify up the food chain. Many of our fish advisories in Oregon are based on methylmercury concentrations that accumulate in the top tier of predators in the aquatic environment, such as large game fish. Methylmercury is also readily absorbed into nervous system tissue and the brain. The critical endpoint is neurodevelopmental damage to developing fetuses, which can occur when pregnant mothers eat fish tissue containing methylmercury, or are otherwise exposed to this compound. The inorganic salt forms of mercury have the kidneys and the immune system as target endpoints, rather than the brain.

The form of mercury in air to which most people are likely to be exposed is elemental mercury vapor. The ATSAC reviewed the same values for mercury back in 2010. EPA IRIS has a Reference Concentration of 0.3 ug/ m^3 , and is what we used for our current ABC for elemental mercury. ATSDR has a chronic Minimal Risk Level of 0.2 ug/ m^3 . And that's based on one of the same studies in adult human workers as was utilized by EPA in IRIS, circa 1999. OEHHA has a chronic Reference Exposure Level of 0.03 ug/ m^3 and this value is based on exactly the same set of studies. In the studies, they evaluated occupational workers exposed to mercury, and were looking for toxicity endpoints like hand tremor and memory disturbance. These are classical signs of mercury vapor neuro toxicity in an occupational setting.

To summarize, all three agencies used the same studies and the same point of departure to come up with their respective protective values. However, OEHHA applied an additional uncertainty factor to account for the potential for young children to have increased vulnerability to mercury exposure as their brains go through development; this mechanism was assumed to happen in the same way that it would occur if children were exposed to methylmercury. In 2010, the ATSAC had all the same information in front of them, but decided to not adopt the OEHHA value, because the committee felt that the additional uncertainty factor of 10 was excessive.

Individual variability is usually broken down into four toxicokinetic differences between people and three toxicodynamic differences between people. So the term toxicokinetic just means how and where the compound moves in the body: how the chemical is taken up, how it's metabolized, where it moves to; and how it's excreted. Toxicodynamics is about the damage that's caused while the chemical is at the site of action in the body. So OEHHA is saying that a standard uncertainty factor of 10 is insufficient to cover the potential toxicodynamic risk related to exposure of a pregnant adult worker the related effects to her developing fetus.

A detailed discussion followed about how each uncertainty factor was applied by EPA and by OEHHA to come up with their separate values for mercury. Bruce Hope's fairly sophisticated modeling in 2010 regarding the potential multi-pathway effects of mercury resulted in the ATSAC choosing the 1995 EPA IRIS Reference Concentration of 0.3 ug/m^3 as the ABC for elemental mercury.

Dean Atkinson pointed out that the 2010 modeling included estimates of overall mercury intake from air at 20% to 40% contribution, with 80% of the air contribution being due to global transport. He said that the 2010 decision on the ABC for mercury assumed that other exposure pathways, such as fish consumption after methylmercury biomagnifies in fish tissue, are not as significant as was assumed then. Elemental mercury itself first has to undergo methylation to become methylmercury, and then that methylmercury has to be taken up in the food chain before it impacts humans. Another committee member said that this committee previously discussed the fact that there is a relationship between the amount of elemental mercury in air and what shows up in fish tissue consumed by humans.

The assumption with methylmercury is that it has a toxicodynamic difference between how it affects adults versus how it affects the developing fetus; and elemental mercury vapor exposure can be considered to have a similar mechanism because it also affects the brain. Researchers have assumed that inorganic elemental mercury travels to all the same areas in the body that organic methylmercury does. Dean Atkinson countered that elemental (inorganic) mercury vapor does not cross the blood brain barrier, and is excreted unchanged, for the most part, from the body.

The ATSAC finally decided that because the scientific literature on mercury effects is voluminous and technically comprehensive, that the current ABC of 0.3 ug/m^3 for elemental mercury should be retained. Bill Lambert asked for a show of committee hands on this proposal, and got unanimous approval.

Items for next meeting

Bill Lambert made sure with the committee members that most would be able to attend the next ATSAC meeting on November 18th, which is only a week before Thanksgiving. He reminded Dave Stone to please comment on the diesel PM memorandum that Bill Lambert plans to provide to the committee within the next couple of weeks, before Dave Stone leaves for this trip. Dave Stone and Dean Atkinson will review toxicity information for phosgene to present at the November meeting; Dave Farrer offered to review selenium and Bill Lambert offered to help; Max Hueftle and Kent Norville will review styrene; Bruce Hope and Dean Atkinson will review n-propyl bromide. Bill Lambert will continue to work on his diesel PM memorandum. The committee decided not to meet in December 2015.

Sue MacMillan and the committee discussed upcoming tasks that need to be addressed:

- Sue MacMillan wants committee to review the summary spreadsheet she emailed to members that designates which of the 52 ABCs are “maybe’s” and “no’s”, in other words, which may need to be reviewed and which do not need review at all. She requested the committee’s input on her decisions.
- Bill Lambert wants to consider developing guidance to accompany the ABCs.
- A couple of committee members and Sue MacMillan want to review previous work done by the ATSAC on short-term guidelines, and decide next steps. The option of asking Mike Poulsen, DEQ cleanup program toxicologist, to speak at our next meeting on his involvement with review of the previous ATSAC’s short-term guideline approach was brought up.
- Sue MacMillan reminded the committee that they had previously asked her to gather and distribute any past internal management directives or other guidance that apply to the use of ABCs; she is currently organizing this information for distribution to the committee.
- Sue MacMillan also reminded the committee that they need to review and evaluate their use of a rounding policy when dealing with toxicity values. Bill Lambert agreed, and asked Sue MacMillan to gather documentation on previous ATSAC discussions on this topic, and have them ready for the committee to consider at the next ATSAC meeting. Sue MacMillan agreed and said she would send out draft information to the committee within the next couple of weeks, if possible.
- Clarification of the ATSAC’s decision for an ABC for tetrachloroethylene made during the April 2015 ATSAC meeting is needed. Some of the toxicity values used to make that recommendation are not well documented, and need to be clarified. Bruce Hope mentioned that he had emailed some relevant information to Bill Lambert on about October 13, 2015 (last week). Bill Lambert asked Sue MacMillan to collate the information and email it to the committee, so that the discussion of this item at our next meeting can go quickly.

Bill Lambert mentioned that he had spoken with Jeffrey Stocum during the break, and heard that the ABC rulemaking process will take about six months, including presentation of the proposed rule to the EQC. Bruce Hope responded that in his prior employment at DEQ, six months is the minimum amount of time needed to go all the way through the rulemaking process and then present the proposed rule to the EQC for final approval.

Comments from the audience

Bill Lambert then opened up the meeting for public comments, and stated that he’d received two audience comment cards. The first comment card that Bill Lambert received was from John Krallman, who had to leave early. John Krallman has attended ATSAC meetings in the past; his background is as an attorney; and he represents the organization *What’s in Our Air*. He strongly supports the committee’s decision to focus on the fluoride anion, rather than hydrogen fluoride.

He suggested that we consider matching the definition of fluoride anion for the ABC to the terminology used in the new source review, which is total fluoride by Method 14. Bill Lambert suggested putting this item in a metaphorical “parking lot” for possible future use in related guidance.

Dale Feik, the second commenter, stated that he is a member of different groups, including the Washington County Citizen Action Network and Citizens Climate Lobby. He is mainly a citizen advocate looking out for air, water and land. He appreciated that Oregon law established the ATSAC, and the use of the cautionary approach to protect public health. He is pleased that the ATSAC’s discussion of fluoride today seems to cover all fluoride compounds that are on the list that Dale Feik provided to Bill Lambert. Dale Feik said that Intel is applying for permit renewal on November the 5th, and proposes to emit six tons per year of fluoride and fluoride-related compounds. Based on testimony Dale Feik heard from George Davis and Dave Monro of DEQ in the past, there is a problem with fluoride impacts to vegetable matter and cattle. Dale Feik wants the ATSAC go outside of their chartered committee scope and choose a fluoride ABC that is protective of cattle as well as people.

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