

Air Toxics Science Advisory Committee

Meeting minutes

Jan. 20, 2016

List of Attendees

ATSAC members in attendance: Bill Lambert, Kent Norville, Dean Atkinson, Max Hueftle, Bruce Hope, David Farrer, Dave Stone.

DEQ staff in attendance: Sue MacMillan, Sarah Armitage.

Introduction

Sue MacMillan, DEQ lead for the ATSAC, welcomed the audience to the meeting and explained fire drill and earthquake protocols. Bill Lambert, chair of the ATSAC, welcomed everyone to the 11th meeting of the ATSAC and mentioned that the agenda for the meeting was published in advance. He explained that the ATSAC would first consider some administrative items and updates, and then move on to review several compounds, including n-propyl bromide, phosgene, styrene, and selenium, and then also begin discussion later on short-term guidelines, picking up where this committee last left off roughly five or six years ago.

Update on Previous Review of Selenium and Other Administrative Items:

At the previous ATSAC meeting in October 2016, ATSAC agreed that selenium should be reviewed to determine if an Ambient Benchmark Concentration could be identified for this element. There appears to be little new information for selenium available, based on our look at information from other agencies. David Farrer took the lead on reviewing selenium.

David Farrer explained that the only toxicology number available for selenium for inhalation exposure is a number from the California Office of Environmental Health Hazard Assessment (typically referred to as OEHHA). However, OEHHA derived an inhalation reference concentration from an ingestion study. Although OEHHA chose to extrapolate an inhalation value from that oral ingestion study, it is ATSAC's policy not to extrapolate an inhalation-based toxicity value from an oral ingestion study. OEHHA itself mentioned in its assessment that the inhalation effects from selenium exposure seemed to be different than the effects caused by ingestion exposure to selenium.

David Farrer explained that there's a lot more irritation of upper airways and related pulmonary symptoms that are not accounted for when you look only at the oral exposure. David Farrer talked with Dave Stone, and their resulting recommendation is to not develop an ambient benchmark concentrations, or ABC, for selenium at this time, because the only toxicity value that's available is one that was extrapolated from an oral ingestion study, rather than an inhalation study.

Bill Lambert explained to the audience that it's important to note that the route of exposure by ingestion, as David Farrer had just discussed, is fundamentally different than the route of exposure by inhalation. This is because ingested material is absorbed from



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700 NE Multnomah,
Suite 600
Portland, OR 97232
Phone: 503-229-6458

Contact: Sue MacMillan
Macmillan.susan@deq.state.or.us

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the gastrointestinal tract directly into the hepatic portal system and goes directly to the liver where compounds can be metabolized – in other words, so-called Stage 1 metabolism goes on. The enzyme systems, like the cytochrome p450 metabolic pathway, can process these compounds. But this type of metabolism doesn't have a great deal of relevance for metals, like selenium. But for other, organic compounds, it is extremely important to consider the route of exposure. This is why the ATSAC has a policy to avoid use of toxicity information that is based on oral ingestion exposure as a way to extrapolate to an inhalation-based protective number.

Bill Lambert went on to state that he has been working on the diesel particulate matter recommendation and the related memorandum, and estimates that he has about a day of work left to complete it. He said that he incorporated the new information from the Health Effect Institute report published in November and just needs to complete the last steps of just doing the calculations for the related proposed ABC. He hopes to distribute the draft memo to the ATSAC committee so that it can be discussed at the next ATSAC meeting.

Next item on the agenda relates to the overview of the entire list of 52 chemicals having ABCs, and the possible need for review of toxicity information for additional compounds in addition to the 52 that already have ABCs, and Lambert said this topic would be discussed later on in the meeting. Bill Lambert then asked Bruce Hope and Dean Atkinson to go ahead with a discussion of their review of toxicity information for n-propyl bromide.

Discussion of Toxicity Information for n- Propyl Bromide

Bruce Hope explained that n-propyl bromide has recently been considered by the dry cleaning industry as a possible, less-toxic replacement for their use of perchloroethylene (also called tetrachloroethylene). N-propyl bromide has been relatively obscure industrial solvent used for degreasing and cleaning. People need to understand that there is no extensive toxicological evaluation required for the use of commercial chemicals, prior to their release into the marketplace. It is interesting to note that there is such a process in place for the evaluation of pesticides before they are released into the marketplace.

n-Propyl bromide was put into commerce as an industrial degreasing agent. There was a minimal amount of toxicology evaluation done prior to this, and this was 25 years ago. Later, when perchloroethylene and Stoddard Solvent became challenged as dry cleaning fluids, the industry began considering the use of alternative chemicals.

The dry-cleaning industry's requirements for the type of dry cleaning fluid to use are specific to cleaning clothes, such as identifying a chemical that specifically cleans clothes well without destroying them or leaving residue behind. Thus, they identified n-propyl bromide as a potentially good dry-cleaning fluid. N-propyl bromide was then put into commerce with a couple of different trade names, for example "DryFall" and "Fabersall"; 10 years ago, the industry was ready to put these into use.

Then the National Toxicology Program evaluated n-propyl bromide and discovered that it had non-cancer chronic effects, primarily damaging the central nervous system. There was also some evidence that n-propyl bromide might be a carcinogen. Nonetheless, the



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700 NE Multnomah,
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producers of the n-propyl-bromide-based chemicals continued to say the chemicals weren't toxic. What they were actually saying was that n-propyl bromide wasn't a greenhouse gas, which is a completely different issue from whether the chemical causes toxic effects to humans.

The National Toxicology Program again evaluated n-propyl bromide, which, according to their studies, turned out to be a really powerful reproductive toxicant. Also, over the past couple of years, n-propyl bromide has been identified as "reasonably anticipated to be a carcinogen", and is regulated by the European Union through the Registration, Evaluation, Authorisation and Restriction of Chemicals program. New York State has banned the use of n-propyl bromide. As we tried to find toxicological information for n-propyl bromide, we discovered that there wasn't much available. Initially, we found a chronic health-based protective value of 20 ug/m³ from the Minnesota Department of Health, related to non-cancer lesions in the respiratory system from exposures, using rats and mice. This value is a very low value. But the following year, Exponent (a well-regarded consulting firm that works only for commercial private clients) published a report on n-propyl bromide. The report stated that n-propyl bromide was a carcinogen, a related risk estimate was calculated, which Bruce Hope felt was a credible process. Exponent thus came up with a protective value ranging from 0.5 to 500 parts per billion, meant to be protective of cancer outcomes from exposure to n-propyl bromide.

Bruce Hope and Dean Atkinson proposed that the cancer-based Unit Risk Estimate calculated by Exponent be used to establish an ABC of 0.5 ug/m³ for this chemical.

Bill Lambert thanked Bruce Hope for his remarks on the potential for a conflict of interest in regard to Exponent estimating the Unit Risk Estimate. Bill Lambert said he had been in situations where he was on the opposite side of the table from epidemiologists at Exponent and felt that they were highly qualified, very good scientists, but that they do represent their clients' interests vigorously. Many of the epidemiologists and toxicologists at Exponent have published in the peer review literature, too. Also, with Exponent being a client advocate, if anything you would expect them to come up with a Unit Risk Estimate that resulted in a much higher (less stringent) value than the 20 ug/m³ listed by the Minnesota Department of Health – but they didn't, they came up with a much lower (more stringent) number, and this fact makes the Exponent value a little more trustworthy.

Sue MacMillan asked if anyone on the committee knew if there were high emission rates of n-propyl bromide in Oregon, based on the current Emissions Inventory. A member responded that he had looked at the recently-published data from the 2011 NATA inventory, but no estimates of emissions for n-propyl bromide in Oregon were given, nor was there any relevant information in the Oregon Emissions Inventory. Sue MacMillan explained that the reason DEQ had requested that the ATSAC review n-propyl bromide was because it appeared that dry cleaning facilities might be deciding to use this chemical in their operations, and a protective number would be needed.

Sarah Armitage, senior DEQ air quality planner, stated that based on coordination with the state dry cleaner program, there is at least one dry cleaner in Oregon using n-propyl bromide in their operations, and there may be others. Hope mentioned that the dry-cleaning industry is now aware that n-propyl bromide is not the perfect replacement chemical they hoped for, and so seem to be moving on and considering other chemicals.



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Sue Lambert summarized the n-propyl bromide discussion by saying that Bruce Hope and Dean Atkinson were recommending that the committee consider an ABC for n-propyl bromide of 0.5 micrograms per cubic meter, which is based on the cancer-based Unit Risk Estimate developed by Exponent, and is ultimately based on studies of the cancer endpoint in rodent and mice models.

Bruce Hope added that the National Toxicology Program is a premier program, recognized as producing highly credible study results, and so feels comfortable with the information on n-propyl bromide. Bill Lambert responded positively and pointed out that the basis of the information that Exponent used to calculate their Unit Risk Estimate came from the National Toxicology Program 2011 studies mentioned.

The ATSAC then voted unanimously to recommend an ABC of 0.5 micrograms per cubic meter for n-propyl bromide.

Discussion of Toxicity Information for Phosgene Toxicity

Dave Stone and Dean Atkinson reviewed the toxicology information available for phosgene. Atkinson said the information is straightforward, and that he and Dave Stone are in agreement about the ABC value they're ready to recommend to the ATSAC. Stone explained that phosgene is a pretty infamous chemical and was used during World War I in gas attacks, and is an acutely toxic material. Phosgene is also an important precursor chemical for many compounds, particularly isocyanides. It is also used as a basis material for many other compounds, as well. There are really only two available toxicology values to consider for phosgene: 1) an EPA Integrated Risk Information System (also referred to as IRIS) value that was developed in 2008, and 2) a California EPA OEHHA value that was derived a couple of years later. Note that EPA used a newer study conducted in 1997 as the basis of their number, while the OEHHA number is based on a 1985 study. There is a 10-fold difference between the EPA and OEHHA values, with the EPA value being the lower (more stringent) of the two – and it is this value that Stone and Atkinson are recommending be used as an ABC for phosgene.

There were no chronic studies identified for phosgene so we have to rely on multiple sub-chronic studies that all seem to support each other's results. The critical study upon which the EPA IRIS number is based is from a sub-chronic in inhalation study done by Kodavanti, et al., in 1997, where rats were used as experimental subjects. No mortality was reported, but sub-chronic effects to the lung were documented. An increase in collagen staining in the lungs was observed, which is a good indicator for the presence of fibrosis.

The data was fit to a multi-stage model to obtain a BMDL (an acronym for a Benchmark Dose Level) of about 0.007 ppm; then they applied a total uncertainty factor of 100. A similar uncertainty factor was used by OEHHA. The total uncertainty factor of 100 is based on an uncertainty factor of 10 to account for human variation; an uncertainty factor of 3 to account of animal-to-human uncertainty; and an uncertainty factor of 3 to account for the uncertainty related to extrapolating a chronic value from a sub-chronic value. Using toxicology protocols, a total uncertainty factor of 100 is obtained. Then a value of 0.3 micrograms per cubic meter is obtained as the (inhalation) reference concentration. Dave Stone and Dean Atkinson both feel this EPA number is more supportable than the



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number available from OHHEA. Although there is nothing fundamentally wrong with the OEHHA value, one of its limitations is that it was based on an acute duration exposure, whereas the EPA IRIS value is based on sub-chronic exposure.

Bill Lambert reiterated that phosgene is well-known to be a powerful inflammatory agent that affects mucous membranes and the respiratory tract, and agrees that the fibrosis-related scarring in rodents is a reasonable endpoint to use for phosgene.

Max Hueftle of Lane Regional Air Protection Agency mentioned that he had reviewed the 2011 emissions inventory data, and found that statewide high exposure level to phosgene occurred in Linn County, at a concentration of about 0.04 micrograms per cubic meter, or about one-tenth of the recommended ABC value of 0.3 micrograms per cubic meter.

Bill Lambert polled the committee on their approval of 0.3 micrograms per cubic meter as the recommended ABC for phosgene, and got unanimous approval. Lambert reiterated that this number comes from EPA IRIS via a study which defined the chronic exposure data using rats and looking at an outcome of early scarring in the lungs, and this critical endpoint represents damage from chronic inflammation from this irritant. A total uncertainty factor of 100 was applied to the study, which can be broken down to an uncertainty factor of 10 for intra-species variation; 3 for the extrapolation from animal to human; and another 3 for extrapolating from sub-chronic to chronic exposure.

Discussion of Toxicity Information for Styrene

Kent Norville and Max Hueftle presented their review of toxicological data for styrene. Max Hueftle explained that styrene is a colorless oily liquid that evaporates easily. It has a sweet smell initially but can be rather unpleasant at higher concentrations. Manufactured homes often smell of styrene.

Max Hueftle further explained that some manufacturers of marine bearings in the Eugene area also use styrene in their operations. Styrene is also used in the manufacturing of tile and faux marble. Styrene appears in the emissions inventory primarily from fiberglass manufacturing, but also it's a product of incomplete combustion. Thus, styrene occurs in cigarette smoke, and from some naturally-occurring sources in small amounts. Styrene was evaluated in a study of occupational workers, where metabolites of styrene were measured in order to back-calculate the exposure.

Kent Norville explained that chronic exposure to styrene affects the central nervous system, and the peripheral nervous system in particular. There are basically two main values available for styrene: an EPA IRIS of value and an OEHHA value. Both values are based on the same study by Moody, which was the study that evaluated exposure of occupational workers to styrene exposed workers. In this study, they followed 50 exposed workers and a control group of workers that weren't exposed. They matched the exposed and unexposed workers groups up for age, sex, educational level, and excluded/limited the workers who used alcohol or cigarettes to help narrow down some of the uncertainties involved. The worker exposure to styrene wasn't directly measured, but rather was determined through the monitoring of urinated metabolites. A number of studies have shown that there is good correlation between styrene exposure through inhalation and the resulting styrene metabolites found in urine, so this protocol is



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700 NE Multnomah,
Suite 600
Portland, OR 97232
Phone: 503-229-6458

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considered credible. Using this protocol, they identified a no-observed-adverse-effect level, or NOAEL, of 34 mg/m³.

EPA IRIS used this number for their calculation of a protective value, and applied an uncertainty factor of 30 to obtain a value of 1,000 micrograms per cubic meter for an inhalation reference concentration.

OEHHA used the same study, but instead of using the NOAEL chose to use a benchmark concentration which approximated the dose response using a model fitting process, and then applied an uncertainty factor of 9 to come up with a value of 900 micrograms per cubic meter. So the EPA IRIS value and the OEHHA value are very similar. Based on ATSAC policy, which is to use the higher of two numbers if they are based on the same study, it is recommended that using the value of 1,000 micrograms per cubic meter as the ABC for styrene, which is based on non-cancer effects. The National Toxicology Program has identified styrene as a likely carcinogen, but there are no numeric values available that quantify the carcinogenic effects of styrene, so no ABC can be calculated for the carcinogenic effects of styrene. We should consider re-evaluating the ABC for styrene if quantified information on the carcinogenicity of styrene becomes available in the future.

The odor from styrene is unpleasant. David Farrer did a presentation years ago that discussed the health effects related to styrene odors. When a chemical smells bad, it is easy to assume it must be toxic, but this is only true in some cases. Although styrene isn't horribly toxic, it does have a strong odor and perception of the odor alone can trigger health effects like headache and nausea. These are hard-wired neurological reactions/reflexes to odors that are real and involuntary. Thus, exposure to the smell of styrene can create a lot of stress and real discomfort, independent of classical toxicological mechanisms. This kind of chronic stress has its own set of negative health effects, so odors are a real concern from a public health perspective. However, there are not any evidence-based methods that provide a numeric quantification of these impacts that would allow the incorporation of odor-induced symptoms and health effects into health benchmarks. Therefore, our ABC will have to be based on the direct toxicological effects of styrene.

Bill Lambert summarized the discussion on styrene. It is a compound that's known to be used in manufacturing in Oregon and as Max Hueftle was saying, it's used in the manufacturing of faux marble and also fiberglass. It is probably also an indoor air pollutant, and present at some level in confined spaces where cigarette smoking occurs.

Neurobehavioral outcomes were measured and the resulting non-cancer endpoint, quantified by both an IRIS and OEHHA as a protective number, indicates that the ABC for styrene be set around 1,000 micrograms per cubic meter; this is the number that Kent Norville and Max Hueftle recommended.

An uncertainty factor (also referred to as a UF) of 3 was applied due to database inadequacy; another UF of 3 was applied due to intraspecies variability; and a third UF of 3 was applied due to lack of information on chronic studies. Multiplying these together creates a total UF of 27, which is rounded up to 30 in keeping with toxicology protocols.



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So, the ATSAC has a recommendation of 1000 micrograms per cubic meter for styrene, and this number would be congruent and with EPA IRIS and the study basis for that is the same as used by OEHHA. Lambert asked the committee members to raise their hands if in favor of recommending an ABC for styrene of 1,000 micrograms per cubic meter. A unanimous “yes” vote was obtained.

Lambert then asked other attending DEQ staff, such as Sarah Armitage, if they had any questions for the committee on the reviews conducted for phosgene, n-propyl bromide, and styrene.

One staff member commented that it is always helpful for DEQ to have a risk-based number, especially for a high-odor chemical like styrene. In the past, having a risk-based number available for a high-odor compound seemed to have lowered people’s stress levels when smelling the odor, once they are shown monitoring results in comparison with that protective level.

Review of Only a Portion of the Existing ABCs Necessary

Sue MacMillan explained that when she began working with this ATSAC, that the members had asked her to take a look at the existing ABCs in order to determine which chemicals now have new toxicity information that has become available since about 2006, which would require a full review by the ATSAC of related toxicity information for that chemical. So this task was completed in a draft form, and it looks like about 24 of the 52 standing ABCs do not have to be reviewed by the ATSAC during this current 5-year-look. But sue MacMillan provided the ATSAC with a table summary of this information, so that the ATSAC, and not Sue MacMillan herself, would make the final decisions. She listed chemicals that she identified as not needing any review, chemicals that did, and chemicals that might need review by the ATSAC. This third category was based on the fact that Sue MacMillan did not feel comfortable placing this group of chemicals into a no-review or yes-review category without input from the ATSAC.

Dave Farrer pointed out that checking for available new toxicity information typically involves checking three main sources: EPA IRIS, California OEHHA, and the Agency for Toxic Substances and Disease Registry, typically referred to as ATSDR. However, other sources might be available, depending on the chemical. MacMillan stated that she realized the ATSAC had already looked at these summary tables, but she wanted them to state, for the record, that they reviewed her summary tables and agree with the review categories in which she placed the various ABCs. All members agreed with the results of her summary tables, regarding which existing ABCs need to be reconsidered.

Additional Discussion of Short-Term Guidelines

Sue MacMillan then brought up the topic of re-considering the way that short-term guidelines (STGs) had been identified by the previous session of ATSAC circa 2012. Because a math error had been identified by a DEQ toxicologist in the Cleanup program during that time, and because there appeared to be some disagreement at the time on the method used to calculate the STGs, the STGs now need to be discussed again, during this current session of the ATSAC.



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Bruce Hope, who had also assisted the earlier ATSAC committee as the DEQ lead at that time, said that they had spent two or three meetings at that time on the topic of STGs. There was some misunderstanding about exactly what we were trying to accomplish with the use of STGs. Just to be clear, he said, STGs are guidelines for exposures with averaging periods of 24 hours, or less. Thus, it's a matter of averaging period. Currently, the ABCs are based on chronic exposure of people, and meant to protect people from exposure that lasts 24 hours a day over the course of at least a year and up to a lifetime – an ABC is a not-to-exceed number applied to an annual average. But questions arose as to what kind of exposure people were being subjected to during shorter exposure periods to possibly higher concentrations of the chemicals.

So, if we utilize STGs, will they actually be able to tell us whether these short-burst emissions are a problem or not? Back in 2012, the request by the public for STGs to be identified sounded like a simple request – but it's actually a very complicated issue. For one thing, people expect STGs to be smaller than, and thus more stringent than, ABCs. But this will never be true because of the way that exposure is calculated, in the cases of both STGs and ABCs. In both cases, a similar exposure formula is used, and one of the parameters in that formula is exposure duration, or the actual time over which an exposure occurs. When an exposure to a chemical occurs over a short time period, then this shorter period means that the person won't be exposed to the chemical for very long. But in the case of chronic ABCs, people are exposed to a particular chemical concentration over a very long period of time. The old adage “the dose makes the poison” is applicable here. If someone is exposed to a chemical over a short time period, their actual dose of the chemical will be much lower than it would be in a chronic exposure situation, which occurs over many years, and up to a lifetime. But people felt that if we didn't come up with short-term guidelines that were more stringent than the ABCs, that we were doing some wrong. But this is incorrect. STGs will always be higher than, and thus less stringent than, our ABCs.

Bruce Hope explained that, in terms of types of STGs, we would have STGs that are cancer-based and STGs that are non-cancer based. In the case of non-cancer-based STGs, it is important to know that effects caused by short-term exposure are almost always different from those caused by long-term exposure. For example, for acute physical symptoms, you might see runny noses and watery eyes, and these symptoms disappear once the person is removed from the exposure. But during longer exposures to non-carcinogens, you nearly always see different, and more drastic, effects, which do not disappear once the person is removed from the exposure; for these types of effects, reproductive and developmental effects are considered the most severe.

Some other agencies choose to start with chronic (longer-term) protective values and then calculate a short-term value on that basis. Note that the two durations of exposure do not typically cause the same non-cancer health effects, which implies different mechanisms of toxicity depending on the exposure duration that occurs.

But the committee had focused on finding a way to get short-term protective values from already-existing chronic values, such as the ABCs. For cancer-causing chemicals, really the only way to obtain short-term values from chronic values is to multiply the ABC by 70. The use of the number 70 is related to the assumption that an average human lifetime is 70 years. This is actually explained in the National Air Toxic Assessment Glossary and



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Guideline, but the only time Bruce Hope had ever seen it used (other than by the previous ATSAC) was in the EPA school initiative study. They used short-term, 24-hr data and annualized it, with the assumption of a 70-year lifetime. So, in Bruce Hope's opinion, the cancer-based short-term guidelines are the easiest ones to calculate.

For short-term guidelines based on non-cancer effects, it is typical to start testing a toxic by exposing small rodents to it for six to eight hours a day, five days a week, for 90 days. In adjusting your no-observed-adverse-effect level (NOAEL, for short) or your lowest-observed-adverse-effect level (LOEAL, for short) from a rodent study to a human, a number of uncertainty factors are applied in order to account for the assumptions made in order to extrapolate a human value from a result from a rodent study. The lung volume and ratio to body size is much different for a rodent than for a human, for example.

Another issue to consider is whether the chemical being evaluated accumulates in body tissues and also stays there without much degradation over a long period of time. If a chemical bioaccumulates and does not break down quickly, then is cumulative damage occurring from a number of short-term exposures to spikes in the chemical's concentrations? If so, how would the potential non-cancer risks from this kind of exposure be calculated? On the other hand, if the chemical degrades or is expelled from the body quickly, then there may not be any additive risks from multiple short-term exposures. Another issue: if a particular chemical initiates enzyme induction in one or more metabolic systems, then even one short-term exposure might be one too many.

Bruce Hope's presentation included information on short-term guidelines for exposures with a 24-hr averaging period. He explained that a choice could be between: 1) obtaining STGs by extrapolating from chronic ABCs, or 2) use acute-based STGs already available from other authoritative sources. He mentioned two considerations for identifying and/or calculating STGs:

- 1) Haber's rule is used by Texas and Louisiana to convert long-term values to short-term values.
- 2) Involves adjusting for volume inhaled – an exposure assumption has to be made, has some uncertainty associated with it.

Identifying or calculating STGS could also include consideration of use of site monitors; talk with industry or community about their concerns; and consultations with the Oregon Health Authority.

Bill Lambert is concerned about STGs being usable on the assumption of immediate risk, particularly in regard to carcinogens, which are typically assumed to occur over a lifetime of exposure. He also emphasized that ABCs are related to chronic, long-term effects, and are not applicable to short-term exposures.

Bruce Hope said that there is some potential for long-term harm during a short-term exposure, but there is little evidence to show short-term exposure/events actually mean anything in terms of actual health impacts. He also pointed out that STGs have very little scientific robustness; for example, many are based on limited study data. David Farrer stated that he uses ATSDR Minimal Risk Levels (for non-carcinogens) to guide his



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responses to acute exposure outcomes. Also, EPA's Acute Exposure Guideline Levels, typically referred to as AEGLs, provide some information related to short-term exposures for certain chemicals.

Bruce Hope presented three options for obtaining STGs:

- 1) Accept that existing ABCs (our benchmarks) are already protective of higher (but shorter) exposures.
- 2) Use someone else's STG values.
- 3) Extrapolate STG values from ABCs using some type of multiplier or proportional calculations that take the differences in exposure times between STGs and ABCs into account.

David Farrer would prefer deriving STGs from acute values rather than from benchmarks; but this process would take a lot of time. Bill Lambert stated that he didn't believe that the ATSAC even has a mandate to set STGs. In the past, the ATSAC originally committed to coming up with STGs by using the ABCs to inform the agency's response. But the task of identifying STGs available from authoritative bodies is a task that's too large for the ATSAC, and would take as much time as setting ABCs has taken. The agency might first want to identify the process that would trigger a response to a short-term exposure.

DEQ staff stated that they appreciated the ATSAC's help with such a complex topic, then brought up some specific issues related to STGs:

- Want STGs based on an exposure time of 24 hrs, because it aligns with typical monitoring durations, and the agency doesn't always have a year's worth of relevant data.
- Perhaps an exceedance of an STG would first trigger a NON-regulatory response, such as further investigation.
- Screening for monitoring or modeling (sometimes odor is involved), and how these tools might be related.
- Work with OHA to interpret the results.
- Would like explicit caveats or best-information recommendations to go with the use of STGs; these would not really be policy-based.
- Don't want to undermine ABCs – they are the bedrock of our health-based program.

Anthony Barnack, DEQ chemist, is interested in a month-long averaging period in regard to the potential use of STGs.

Bill Lambert suggested that recommendations on how to use STGs be laid out in a cascade of steps:

- 1) Look for existing Minimal Risk Levels (MRLs)
- 2) Understand what is happening at the facility, including whether additional modeling or monitoring is needed.
- 3) Use a hierarchy of available information

Dave Farrer said that these steps are best practices that he would follow.



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Concentrations above the ABC but below the acute value is a zone that would need to be discussed.

Maybe make a policy decision to multiply each ABC by 20 to get an STG?

The ATSAC needs to recommend a best-science-based approach, but is not sure how the DEQ plans to use STGs. DEQ need to be the one to make policy decisions. Do they want to use a benchmark-like process?

The ATSAC requested that DEQ craft a statement on exactly how the agency want to use STGs, because the STG approach will probably be a policy-based approach. Then the ATSAC can provide advice on the related science.

Documentation to consider using to identify STGs:

- California OEHHA short term values
- Texas Commission of Environmental Quality short term values
- AEGLs – Acute Exposure Guideline Levels (US EPA)
- EPA Action Levels for schools monitoring

Kent Norville asked about the variability we see in air monitoring data, and suggested that DEQ provide the committee with a summary of air toxics spikes based on monitoring data.

Bruce Hope suggested that DEQ could think about form, e.g., by how many times does the air concentration exceed the benchmark concentration; or could also generate STGs for specific compounds, maybe based on which chemicals showed spikes in air concentrations by reviewing DEQ air monitoring data.

After much discussion of how best to calculate and/or identify STGs, the committee finally agreed that the most-defensible way to choose a list of STGs for chemicals in Oregon was to obtain them from other agencies and jurisdictions, rather than trying to back-calculate STGs from chronic ABC values.

Using this approach, the ATSAC would have to go through a review process for STGs very similar to the one they've already gone through for ABCs. The committee as a whole said this task was more than they could take on as a volunteer committee, and recommended instead that DEQ go through the review process themselves, and choose an STG for each chemical of concern, using STG-related values from other agencies and organizations, rather than from the primary literature. STGs from other agencies and organization have already been studies and vetted.

The ATSAC requested that the next meeting, which is currently planned for February 17, be shifted back or forward by a week.

Audience Comments

Mary Peveto was happy to see that STGs were an item on this meeting's agenda. She said the public is concerned about STGs. Agency previously responded to a Neighbors for Clean Air request by asking the ATSAC to develop STGs. She doesn't want an emphasis on ABCs to obscure the STG question. She agrees that spikes of metals concentrations in air are of the most interest.



State of Oregon
Department of
Environmental
Quality

Environmental Solutions, Technical Services

700 NE Multnomah,
Suite 600
Portland, OR 97232
Phone: 503-229-6458

Contact: Sue MacMillan
Macmillan.susan@deq.state.or.us

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Dale Fiek agreed with Mary Peveto's comments. He said phosgene is a chemical sometimes used without knowledge of how it harms people.



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