**Flame Retardant Advisory Committee Sept 28, 2018 meeting notes**

Stakeholder advisory members in attendance:

* Grant Nelson, Representing Washington Association of Business
* Holly Davies, PhD, Local Hazardous Waste Management Program, King County Parks and Natural Resources
* Kevin J. Delaney, Environmental Compliance Coordinator, Costco Wholesale
* Elizabeth Friedman, MD, Pediatric Environmental Health Specialty Unit, University of Washington
* Jennifer Lanksbury, WA Dept of Fish & Wildlife
* Shirlee Tan, PhD, Toxicologist, Seattle-King County Public Health
* Heather Trim, PhD, Executive Director, Zero Waste Washington
* Laurie Valeriano, Executive Director, Toxic-Free Future

Stakeholder advisory members by Webinar:

* Richard Henrich, LANXESS Solutions US Inc.
* Andy Hackman, Juvenile Products Manufacturers Association
* Donald Lucas, PhD, Lawrence Berkeley National Laboratory (retired), Green Science Policy Institute.
* Brad Miller, Advocacy & Sustainability, BIFMA
* Joel Tenney, Director of Advocacy, ICL (Israel Chemicals Ltd)

Department of Health (DOH) & Department of Ecology (Ecology) team

* DOH - Barbara Morrissey, Jennifer Sabel, Lauren Jenks, Theresa Phillips, Laura Baune, Elmer

Diaz, Lenford O’Garro, Kelly Cooper, Peter Beaton

* Ecology – Saskia Van Bergen, Callie Mattheu, Damon Delistraty

Others attending (in person or by webinar)

* Erika Schreder, Science Director, Toxic-Free Future
* Andrea Carey, Biologist, Washington Department of Fish & Wildlife
* Becky Berg McClintock, Costco Wholesale
* Pratik Ichhaporia, Intertek
* David Panning, BIFMA
* Matthew Nudell, Bureau Veritas
* Meg Hughes, Bureau Veritas
* Donald Asleson, Target Corp.
* Evan Bruning, Serlin Haley LLP
* Kelly Hamden, UL
* Kerri Malinowski, Maine DEP
* Troy Nichols, Toy Association
* Lawrence Petrick, International Association of Fire Fighters (IAFF)
* Laxmi Ravikumar, Intertek
* Steve Scherrer, Lanxess Solutions
* Lauren Scott, American Chemistry Council
* Racquel Segall, IAFF
* Jonathan Rivin, Oregon DEQ
* Joel Tenney, ICL IP
* Kristine Begley, Samsung

**Introduction:**

**Jennifer Sabel, DOH**, welcomed stakeholders to the second meeting of the Flame Retardant Stakeholder Advisory Committee. **Theresa Phillips, DOH**, reviewed the meeting agenda, the role of the advisory committee and the agency’s guiding principles for developing policy options for consideration by the legislature.

The project timeline has been extended to balance other priority work at DOH. At the November meeting we will wrap up presentations about fire safety considerations and will seek input from stakeholders about potential policy options. In our new project timeline, we will post a draft report with findings, policy options and recommendations for stakeholder review and comment by April 2019. After we consider stakeholder comments, we will draft a final report for the legislature by July 2019.

**Barb Morrissey, Environmental Public Health Sciences, DOH** presented further work on the human health review of the six flame retardants in HB2545. She recognized Lenford O’Garro, another toxicologist at DOH for assistance with collecting and analyzing quantitative information on hazard and human exposures. Barb presented initial information on uses, toxicology and exposure at the last stakeholder meeting. She has updated that information with more recent studies from 2016-2018 and has posted written summaries for the 6 flame retardants on the project webpage. *She encouraged stakeholders with expertise on uses, toxicity, exposure studies and environmental fate to review the six summaries and send any comments to Barb by mid- November.*

She shared a summary chart of uses of these 6 flame retardants by product sector. In addition, 4/6 chemicals have other uses (e.g., plasticizers and solvents). All are reported by manufacturers as being used in flexible polyurethane foam. TCPP is also used in rigid foam used in building insulation. There are also reported uses in electronics and all but IPTPP have been detected in car dust indicating use in car interiors. There is a detailed use summary in the posted information. *DOH would appreciate stakeholder review and correction of uses as described in the posted summaries and the presented chart as necessary.*

Barb then presented the results of a literature review conducted by DOH for hazard screening values and human exposure estimates for the six flame retardants. The information is presented to introduce stakeholders to the findings that DOH will post in a detailed write-up later this month for stakeholder review and comment. With regards to available hazard screening values, none of the compounds have robust reference doses developed by EPA IRIS or equivalent government programs. All of the flame retardants have data gaps in their underlying data, including a cancer testing data gap for TCPP. TBB has no individual toxicity tests – only tests on a TBPH/TBB mixture. DOH did identify screening level and provisional references doses (RfDs) for TBPH, TBB, TCPP, TPHP. The only health-based numbers identified for IPTPP, V6 were Derived no effect levels (DNELs) in the ECHA database (ECHA is the European Commission chemicals agency). In addition to data gaps in available toxicological information, the screening values have the following limitations: all are based on rodent rather than human response to these chemicals, and some are based on proxy chemicals or on isomer mixtures which may vary from one commercial mixture to another. In some cases, newer information from independent research reported lower effect levels than those used in the RfD.

Human exposure estimates were compiled from peer-reviewed studies with a focus on U.S. and Canadian studies when available. There were limitations to exposure estimates included in the DOH analysis. Many estimated intake from just 1 or 2 pathways such as ingestion of house dust or inhalation of indoor air. Comprehensive approaches need to consider inhalation, dermal, and ingestion intake from the known sources of human exposure identified. This includes indoor dust and air from a variety of settings (office, home, daycare or school, car). Also should include intake from direct contact with treated materials, and residual levels in food and drinking water when indicated by occurrence data. This type of aggregate exposure assessment requires a broad data set that isn’t available yet for these 6 flame retardants. Barb gave an example of an important data gap: the lack of food surveys for flame retardants in the U.S. diet. Recent dietary surveys in Sweden and Belgium, where flame retardants use is lower, showed that diet may be an important source, especially of TCPP.

Barb then showed a slide for each of the six flame retardants that showed the identified exposure estimates relative to the available chronic hazard screening value. The exposure data plotted are in ng/kg-day and present both average exposure estimates (bottom of the bars) and high-end exposure estimates (top of the bars) for both children (teal bars) and adults (grey bars). No exposure estimates were available for IPTPP. In 2018, the EPA instead used exposure estimates for TPHP to approximate exposure to IPTPP. Children’s exposure estimates were consistently higher than adult exposure estimates. Nearly all the exposure estimates were well below the hazard screening values. Several estimates of daily exposure to TPHP approached or exceeded an RfD derived by Björnsdotter et al. 2018.

Barb showed a few study results to illustrate the need for understanding the risk for any one flame retardant in the context of cumulative exposure to a wide variety of other flame retardants found in house dust, indoor air and biomonitoring studies. Different flame retardants may have a combined contribution to an adverse outcome such as impaired neurodevelopment in children. When considered separately, any one chemical might not be a demonstrated risk. A number of other flame retardants found in exposure studies have similar structures and may share overlapping biological activities. This includes phased-out flame retardants like PBDEs that are still widely found in indoor dust and biomonitoring studies. The impact of cumulative exposure has not been assessed but is likely to be important. Other chemicals like organophosphate pesticides and phthalates found in the diet and house dust may also have overlapping biological activities with these flame retardants. It is not possible to do a cumulative risk assessment within the scope of this project. At this point DOH plans to provide a narrative as context in the legislative report. Other suggestions for how to address this issue are welcome.

Q&A

1. What’s the evidence of use or potential use for these FRs?
   1. We relied on uses reporting by manufacturers to EPA in 2016 under the chemical data reporting program. We also used use information in government reports and data from product testing.
2. Do you have any information on production volume for TBB & V6 from 2015? Others? Can we ask manufacturers to provide that information?
   1. That information is listed as confidential business information in the EPA database. Manufacturers were unable to promise release of this information.
3. Are the results on the slides going to be in the written summaries?
   1. Yes, Barb is still working on the write-up and will post it later this month for stakeholder review.
4. Are there any biomonitoring studies for V6?
   1. We did not identify any that measured for V6.
5. On the importance of considering dietary consumption (Poma et al., 2018), why is TPHP showing up in grains?
   1. This hasn’t been investigated. Perhaps TPHP is taken up into grain plants from their environment? The study found higher levels in processed foods. It could be migrating from food processing equipment into the food.
6. Is there any outdoor ambient air data?
   1. Yes there are limited data, especially in the Great Lakes area. See the posted summaries.
7. These RfDs are not reliable numbers. Are there other effects or study results that suggest that the RfD should be lower? How much lower?
   1. In some cases, there are studies that show adverse effects at lower doses in rodents. For example the RfD we used for TPHP was derived from a chronic no adverse effect level (NOAEL) of 12 mg/kg-day but in one study of prenatal exposure in rodents, effects on metabolism and weight were seen at 0.5 mg/kg-day.
8. What about household cats? One stakeholder encouraged DOH to look at pets since they may pick up more dust during grooming.
9. Will the PowerPoint be shared publically?
   1. Yes, we will post the slides on the project website next week. We will also provide meeting notes that summarize the presentations and the stakeholder discussion. Finally, Barb will post her write-up of the quantitative work within the next month for stakeholder review and comment.
10. Stakeholder comment (Laurie V.): Cumulative impacts seem so critical, and working one chemical at a time doesn’t seem efficient. Grouping chemicals should be included into the conversation. The rational approach is to look more broadly at a group of chemicals instead of individual chemicals. How do we address these chemicals more broadly? Example, California uses additive flame retardants as a class in restrictions in certain product categories; CPSC included all organohalogens in their action on additive flame retardants.
11. Stakeholder comment (Steve S.): I disagree with this approach. Different chemistries have different effects. Efforts that group chemistries are not using a scientific approach. These efforts may not have scientific people involved. The industry looks at the science, toxicology, and can use “read-across” for individual chemicals. It’s a mistake to group chemicals together & ignore the science. Looking at one chemical at a time does have some advantages since they are regulated individually and made by different companies.

**Callie Mathieu, Environmental Assessment Program, Ecology** presented on Washington State sampling results for these 6 FRs in storm water, surface water, sediment and fish tissue. She described the three studies she evaluated.

* Ecology measured TBB, TBPH, TCPP, TPP, and V6 in storm water and sediment collected from commercial drainages in Clark County in the spring and summer of 2017.
* The United States Geological Survey (USGS) analyzed environmental samples for TPP and TCPP in their investigations of emerging contaminants in the Lower Columbia River ecosystem.
* Ecology is currently conducting a study to evaluate concentrations of flame retardants in 10 waterbodies of Washington State.

TCPP, TPHP and V6 were detected in surface waters and sediments in Washington State. TBPH and TBB were not detected although the reporting limits for TBPH in these three studies was a little higher than another study in the Great Lakes that did show detections of TBPH. IPTPP was not included in any of the three studies.

TCPP had the highest measured concentrations in both sediments and surface water. The concentrations were highest in catchment areas for urban/industrial storm water.

TPP consistently detected in industrially impacted sites, but not frequently in ambient water and sediments.

V6 was detected infrequently, at low concentrations.

While WA-specific data are limited, the WA detection frequencies and concentrations were similar to or lower than other North American/European studies.

Q&A

1. Did you look at effluent from wastewater treatment plants? What about biosolids data?

a. We reviewed WWTP data, but did not consider it environmental data and did not include in the report. We will re-consider the WWTP data. We did not find WA-specific biosolids data and did not look at other biosolids studies.

2. Why are reporting limits higher for TBB & TBPH than for the other FRs in your studies?

a. This is how the instrument is responding at the laboratory. They get down as low as they can.

3. What about levels in Orcas & salmon? Since resident Orca survival is in question, need to look at potential additive impacts from historic flame retardants PCBs & PBDEs and these newer FRs. Similar to what Barb discussed for the health studies. We need to examine existing contaminant data out there. We can’t look at these chemicals in isolation.

a. Callie – My role in this project is very limited. That is a larger scope.

4. Did sampling for surface water occur at storm water runoff samples or outlets? Did you also take samples in the middle of the lake?

a. The lake surface water and lake sediments were collected in the middle of the waterbody - far from point sources. The Clark County data was collected in stormwater catchments. The Lower Columbia River data was generally collected away from point sources.

5. Are you including other areas besides WA? There was a recent study in NY on surface water that had interesting results. TCPP was most frequently detected and at the highest concentrations. TCPP found in surface water, tap water, and rain water.

a. Looking at other areas makes sense. We should be mindful of detection limits in comparisons. (I'm not sure what you want to say here. I wont' have time to look at other areas besides WA. I think it makes sense - but I don't have the room on my work load. Maybe we say something like "We currently don't have the resources to provide a larger review of the literature.")

**Damon Delistraty, toxicologist, Ecology** presented on his work to assess the potential ecological impacts of the flame retardant levels measured in the three studies that Callie just reviewed. He presented his approach and pointed out where there is uncertainty but also where conservative assumptions were made. He used the maximum environmental levels of these FRs in the WA data sets and assumed conservatively that flame retardants were present at the laboratory reporting limit value when there was no detection. He used hazard screening values available in the literature or estimated using standard approaches. Limited ecotox data were available for aquatic biota and minimal to no ecotox data were available for these flame retardants impacts on terrestrial biota. In some cases only acute lethality data were available for an indicator species. When the hazard quotient is greater than 1 that means that the environmental level exceeded the screening value and we have a potential concern. If the hazard quotient is less than one, it is typically considered that effects are unlikely or that levels are below concern.  None of the hazard quotients exceeded one (See tables). *Damon’s full write-up is now posted on the project website and contains the details of his approach, the uncertainty involved, his results and conclusions, and his references. Stakeholders are encouraged to review and comment on that rather than this brief summary of his presentation.*

1. Were there biosolids data?
   1. He only evaluated Callie’s data. He did not look elsewhere for data.
2. Can we make the conclusion that adverse impacts are unlikely given the lack of ecotoxicology data?
   1. He agrees & will clarify the conclusion by adding qualifiers.
3. (Laurie V.) Can you please remove the conclusion of lack of adverse impact? You do not have enough data to conclude there is no adverse ecological impact. It reads that there’s not a problem.
   1. Conclusions are based on data set I looked at. Agree that it is very limited, & there is some uncertainty with the assessment. There is more data for aquatic biota than terrestrial biota. Will revisit qualifiers around the conclusions & clarify.
4. (Erika S.) Another thing to keep in mind is that measurements reflect what we measure for. If we measure only for the parent compound and don’t measure for environmental metabolites, we may be missing some of the environmental load of these chemicals.  This is especially true when we look at levels in biota since these compounds are metabolized. With other brominated flame retardants, we are measuring more metabolites in biota samples.

**Safer Alternative Assessments**

**Barb Morrissey, DOH** provided a brief background of WA state history on flame retardant alternative assessment. In 2007, the state legislature acted on recommendations in a 2006 statewide chemical action plan (CAP) for polybrominated diphenyl ether (PBDE) flame retardants. The legislature restricted deca-BDE in certain products contingent on first identifying a safer alternative. A 2008 assessment of alternatives to deca-BDE in computer and TV enclosures and in residential upholstered furniture found safer alternatives. Since then the field of alternative assessment has developed considerably and several comprehensive guidance documents are available (e.g., NRC Guide 2014, IC2 Guide 2017). Safer alternative assessment is a systematic method for identifying and evaluating alternatives. It is a tool to help businesses avoid regrettable substitutes when replacing a problem chemical in their products. In the IC2 guide, developed by scientists at Dept of Ecology and other states, there are four required components of an alternative assessment: hazard, performance, cost & availability, and exposure. There are also optional modules depending on the goals of assessment.

EPA responded to health and environmental concerns about flame retardants by partnering with industry to develop alternative assessments for four separate FR applications. EPA focused on the hazard evaluations and allowed industry to assess their costs, and performance. These AAs can serve as a resource for business and for our discussions about safer alternatives for particular flame retardant applications. To learn more: <https://www.epa.gov/saferchoice/design-environment-alternatives-assessments>

Barb finished this introduction of safer alternative assessments by sharing some broader questions that can help frame our thinking about the alternatives to consider. First consider if an alternative is necessary. If it is, consider safer substitutes as well as material substitution and product reformulation and design changes.

Q&A

1. Since use of FRs in furniture & other items is related to flammability codes, do other places around the world have the same standards? Are the products made differently elsewhere as a result of it?
   1. Becky Berg, Costco, responded that in the furniture sector they see primarily that flame retardants have been removed from products (e.g., furniture) in the U.S. However, in the UK, FRs are still required. On the global market, they distribute two different products. Companies need to have both processes for manufacturing globally.
2. What about automobiles? What are the standards? Do car manufactures make different cars of the same model for sale in the US that have FRs and sell the same model without FRs in other countries?
   1. Barb - Not familiar with that. In general, there are different standards in different countries. Each product sector (electronics, cars, airplanes) have different codes. Even residential and office furniture have different flammability standards.
3. Stakeholder comment (Laurie V.): It helps to break it out by product sector. For example California law separates children’s products, furniture, and mattress. Barrier fabrics, and other materials can meet furniture standards. Furniture manufacturers say that’s the direction. For electronics, the outer casing can have different standards than the inside. European International standards are coming & they will be more flexible in how to meet standards. The agency should consider a broader policy. Non-halogenated compounds can meet those standards. Need to address & make sure they are safe. International standards have more flexibility to meet these standards. First step is to look at the European regulation, US regulation in addressing organo-halogens FRs & remove those. The TVs industry is moving towards using a regrettable substitute. This broader approach needs to be pursued in policy. Cars, insulation need more information, but should not be taken off the table. Most work done on where standards can be met.
4. Should we focus on the product sectors that contribute the most to exposure in the home?
   1. Barb- Furniture foam is thought to be a large reservoir of FRs at home. Supported by some studies out of Stapleton group.
   2. Erika S. – some exposure studies show electronics correlate more strongly than furniture with children’s exposures in the home. This is a surprise because of the smaller footprint. TCPP is replacing HBCD in building insulation and may be a significant contributor to indoor levels.
5. Correctional Industries makes the furniture for state offices. Has anyone reached out to them to see what they are using for FR’s? Can this be specified in the contract or could a purchasing preference apply?
   1. (Holly D.) She’s visited Correctional Industries (several years ago) to learn whether FRs were used in the furniture purchased by the state. The staff did not know what was in the foam they bought for furniture assembly. Illustrates the frequent lack of transparency in supply chain.
   2. (Saskia V.) ECY has not tested Correctional Industry products, but is fairly confident most of the products currently made by Dept. of Corrections don’t use FRs. Ecology is working on environmentally preferable purchasing efforts.
6. Do flammability codes need to be revisited?
   1. (Laurie V.) Some flammability codes need to be revisited regarding their unintentional impacts on public health, firefighter health, and the environment. A number are voluntary industry standards, driven by industry.
   2. (Grant Nelson) TB117 was modified to be a smolder standard, dropped the open flame standard. Not everyone agrees that was an improvement.
   3. (Don Lucas) In CA, some flammability codes are being reevaluated – are they necessary/reasonable? When standards have changed, industry has been quick in changing their FR use. CA rules changes went through a technical committee review. There was a cost-benefits analysis. It looked at barriers fabrics. What’s the cost of doing this regulation? Cost of adding the material, how many people have died putting out fires. Cost-benefit showed that in CA there was a huge cost to save a very small # of lives, $ 1 billion vs. 1-2 lives.
   4. (Brad M.) In CA, BIFMA engaged in the FRs issue. We work to make sure fire codes don’t drive the usage of hazardous FRs in our products, when they aren’t necessary. We accept the new code. He continues to work on TB133 with CA. WA should take a closer look at CA work, work with CPSC, and try to align its recommendations so there is a uniform national template. It creates extra burden for industry to have different states taking different approaches or creating different standards. From a manufacturing perspective, consumer products are marketed nationally, important for us to have a similar model.
7. (Steve S.) Use of FRs originated in early 70s based on a report America is burning, there was public outrage, and many people died in fires in the 1970s. Various state agencies responded by developing building codes and standards, smoke alarms, sprinkler system, moderate fire hazards associate w/ materials at home. Manufacturers don’t want to spend money unnecessarily and don’t want to add toxic chemicals. They add chemicals to protect people from dying and to meet standards. There are not a lot of safer alternatives out there that will work. This is not a simple problem to solve. Fire statistics need to be reviewed. I encourage stakeholders to visit the NAFRA site for industry perspective on FRs. <https://flameretardants.americanchemistry.com/About-North-American-Flame-Retardant-Alliance-NAFRA-/>
8. (Erika S.) Furniture is important but insulation is also a concern. Don’t forget to add this.
9. (Heather T.) Styrofoam blocks are being used in road construction, are they putting FRs in that? If so, it may have a direct impact on storm water.

*Barb asked stakeholders to send her additional examples of noteworthy approaches or initiatives for evaluating safer alternatives regarding flame retardants.* We are interested in both chemical alternatives and design or material substitutions. We would like to learn more about how businesses are approaching this issue in general, as it will inform our discussion about policy options. Saskia is the alternative assessment chemist at Dept of Ecology. She’s helping us with this part of the project.

**Q&A with Don Lucas, PhD, combustion scientist at Lawrence Berkeley National Laboratory (retired)** **and consultant with the Green Policy Institute.**

Barb briefly summarized Don Lucas’s presentation from meeting #1 about fire safety considerations. Since we did not have time for Q &A after his presentation, we made time on this agenda for stakeholders to ask Don their questions.

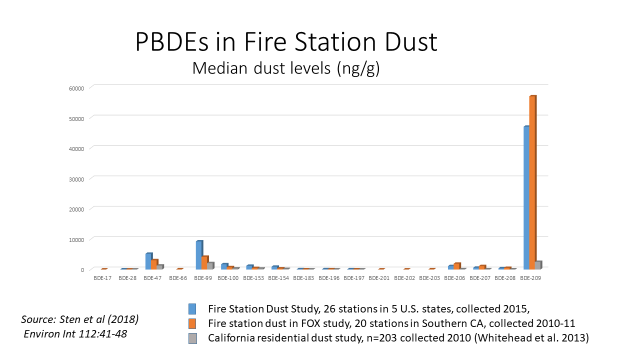
1. Has anyone done an assessment of flame retardants and car fires? Are FRs necessary in car interiors?
   1. Don –Car fires are usually pretty big and are dangerous to passengers, firefighters, with lots of nasty chemicals there. Children’s car seats are required to meet automobile standards and often have high levels of FRs in the material in contact with children’s skin. Fires are not starting in kids car seats. Does this actually prevent any injury? No one is studying this.
2. What statistics are available on car fires?
   1. Don - NFPA has some data about car fires on their website (<https://www.nfpa.org/News-and-Research/Fire-statistics-and-reports/Fire-statistics/Vehicle-fires>)
3. What about responsible disposal of car seats given the large FR load? You can’t donate them or sell car seats for reuse.
   1. Don - Have not looked at the responsible disposal of car seats in particular. We have looked at the responsible disposal of plastics and insulation containing FRs. We have no great way to deal with these materials - the FRs are very persistent and most end up in landfills.
4. Are there any data specific to flame retardants in products and injury from smoke inhalation? Is there increased risk of death because FRs increase smoke production or are toxic in smoke?
   1. Don –most people die from smoke inhalation (a toxic soup), not the fire itself. The contribution of hydrogen cyanide and CO poisoning vs. smoke particles or other combustion byproducts (including FRs) is hard to know. Fire fighters exposure to FRs is likely from chronic exposures. There is definitely a big exposure. Don said it’s hard to assign causation of cancer deaths.
5. Are there good sources of information about building insulation & are FR necessary in that application?
   1. Don is actively involved in looking at that. Some applications of insulation can be used safely without FRs. Foam insulation underneath concrete foundations don’t need FRs since it is not a fire safety hazard.

Stakeholder comment (Steve S): There is no such thing as safe smoke, even in a fireplace. FR are just that -retardants, they do not prevent fires. FRs don’t create fire proof materials, they are designed to smolder the fire, allowing greater escape time.

**Dennis Lawson, President of Washington State Council of Fire Fighters** is here today for A.J. Johnson. Dennis introduced himself to the committee. He is a second generation fire fighter and has seen big changes over the years in their safety practices as awareness has grown about the dangers of breathing smoke and skin exposure to smoke residues on their gear. It used to be a badge of honor to wear a sooty helmet, now they all do primary decontamination outside after a fire and then everything gets washed back to the station. He introduced Larry Petrick from IAFF to talk more about the concerns fire fighters have about flame retardants and their national work underway to address those concerns.

**Larry Petrick, Deputy Director of Occupational Health, Safety and Medicine, International Association of Firefighters (IAFF)** provided an oral presentation over the phone (his full statement is posted with the other meeting materials).

Barb showed the following slide to visually support his comments.



Q&A

1. Can you list few of the cancers that are higher in firefighters?
   1. Common cancers are brain, colon, kidney, melanoma, multiple melanoma, prostate, non-Hodgkin lymphoma, rectal and stomach cancer, skin (NIOSH study).
2. Thank you for this good presentation. If you need information on these studies, don’t hesitate to ask. We should try to reduce these toxicants as much as we can.
3. Are there also FRs in the turnout gear? Which chemicals get through gear to the skin of firefighters?
   1. Turnout gear consists of three layers – outer shell, thermal barrier, and moisture barrier. Our turnout gear outer shell is constructed of inherently flame resistant materials. We don’t know if flame retardant chemicals are added to this process, or applied to the thermal layer and moisture barrier. That is proprietary information.
   2. A fluorescent tracer study used fluorescent particles in the range of particulate size at a fire. This test indicated the weak areas in our turnout gear, as these particles appeared on the skin and clothing under the turnout gear. Combustion particulates and chemicals can reach our skin. Some of these toxic chemicals can be absorbed into our bodies. The ultrafine particulates can be inhaled as we transport our gear back to the station. The dust study also shows how living areas of fire stations have higher levels of FR in the indoor dust.
4. How’s the cleaning up of the clothing?
   1. Fire departments wash their turnout gear with washer extractors. Some send it out to a third party to clean. In determining how clean is clean, that is a difficult task because of the large array of chemicals we are exposed to in the combustion process (i.e. while fighting the fire). Nonetheless, it is cleaner after washing.
5. (Laurie V.) The slide shows that the form of PBDEs, deca-BDE, used in electronics has the highest concentration in fire station dust. The chemical industry has switched to chemicals very similar to deca-BDE in electronics which are not on the list of 6 Frs. Also demonstrates why we need to look up these chemicals more broadly.
6. (Holly D.) Fetal exposure, women of childbearing age, pregnant women that work in the fire service should be considered in terms of exposure. We should include them in our analysis.
   1. There are women in the fire service, we protect them from smoke and active fires when they are pregnant.
7. (Shirlee T.) Issue of taking work clothes home in terms of secondary exposure to children. What about taking some precautions to prevent take- home exposures.
   1. It may not be possible to limit all take-home exposures, although there is more being done to limit this from happening.

**Preemption of state action by the Toxics Substances Control Act, as amended in 2016.**

Barb Morrissey reported back to the group on a question that arose about federal pre-emption at the first meeting. At this point there is no pre-emption of state action on these 6 flame retardants by TSCA. She consulted with the state attorney general’s office to confirm.

She reviewed the pre-emption provisions of TSCA for existing chemicals. 5/6 flame retardants listed in HB 2545 are still in the prioritization phase at EPA. If EPA chooses any of these 5 for their next 20 chemicals for risk evaluation, a pause pre-emption takes effect until the risk evaluation is complete. The pause pre-emption does not apply to chemicals that EPA started evaluating under the 2014 TSCA work plan. If EPA determines that the chemical presents unreasonable risk and adopts risk mitigation actions. Those final actions may pre-empt state action.

IPTPP is listed as a PBT under TSCA section 6(h). Although we are not pre-empted from taking action yet, state actions are likely to be pre-empted when EPA adopts action for reducing exposure to IPTPP “to the extent practicable” as required. EPA must propose these actions by June 2019 to meet the timelines set out in the law. Action must be finalized with 18 months of proposal.

Next steps – *At our next meeting we will start developing policy options to provide info for our report to the legislature. We may be contacting people with various product sectors to help inform and frame the discussion.*

Meeting was adjourned at 2 PM.