

**Toxics Use Reduction Institute Science Advisory Board Meeting Minutes**  
**September 22, 2023**  
**Virtual Zoom Meeting**  
**9:30 AM**

**Members Present:** Robin Dodson (Chair), Christine Rioux (Vice Chair), Alicia Timme-Laragy, Heather Lynch, Lisa Cashins, Helen Poynton, Christy Foran, Wendy Heiger-Bernays, Rich Gurney, Denise Kmetzo, Ryan Bouldin

**Program staff present:** Liz Harriman (TURI), Heather Tenney (TURI), Karen Thomas (TURI), Hayley Hudson (TURI), Sandra Baird (MassDEP), Nicole Moody (DEP), Kari Sasportas (OTA), Caredwen Foley (OTA)

**Others present:** Carol Holahan (Foley Hoag for ACC), Christina Bramante (Nano-C), Raza Ali (ACC), Katherine Robertson (MCTA), Jerome Lang (Nano-C), Laura Spark (Clean Water Action), Owen Jappen (ACC), Kuper Jones (ACC), Terry Hyland (Chemical Watch), Robert Rio (RAR Strategies), Tom Lada (Nano-C), Sarah Mattalian (Inside EPA), Robert Simon (ACC and its North American Flame Retardant Alliance)

***Welcome & Introductions***

The chair noted that this meeting is being conducted remotely, due to an extension of the temporary provisions of the open meeting law signed March 29<sup>th</sup>, 2023, by Governor Healey. This allows the extension of the remote meetings under the Open Meeting Law until March 31, 2025.

To start, we welcomed our newest member to the Science Advisory Board, Dr. Ryan Bouldin. Dr. Bouldin is an Associate Professor in Natural and Applied Sciences (Chemistry) at Bentley University and fills one of the three seats nominated by EEA. Board members introduced themselves, program staff were announced, and attendees were asked to put their name and affiliation in the chat.

***Approve May Meeting Minutes***

A motion was made to approve the May meeting minutes, and there was a second. There was an edit recommended to change the pronoun in the appearance of conflict filing regarding flame retardant work; Heather will make that change. A roll call vote was conducted, and the minutes were approved by the 11 members present with ten votes in favor and one abstention.

***MWCNT, SWCNT, and CNFs as Potential HHS***

The petition to add CNTs and CNFs to the TURA chemical list requested a lower reporting threshold (100g); the TURA statute requires a Higher Hazard Substance (HHS) designation for this to happen. Most members were not on the Board when the last HHS designation occurred in 2016. The HHS designations were first selected from the “more hazardous chemicals” guidance list that was developed by the Board in 1999. At that time, the Board collected a standard set of information available at the time (LD50, IARC, RFD, TLV, BCF, FP, LC50), and then used an expert judgement process to prioritize the TURA chemical list. The board studied the 258 chemicals that had been reported under TURA and they chose 38 “more hazardous” chemicals and chemical categories and 22 “less hazardous” chemicals and

chemical categories from that group. In the early 2000s the Board considered additional unreported to date, TRI chemicals. The 2006 TURA amendments authorized the Administrative Council to designate up to 10 chemicals per year as Higher Hazard Substances (HHS) and up to 10 chemicals per year as Lower Hazard Substances (LHS), using the “more hazardous” and “less hazardous” lists as a starting point. In general, HHS recommendations have been either carcinogens, acutely toxic, or had low TLVs and have come from the “more hazardous” list, although the board process can evolve as understanding of hazards has evolved. In response to a question, it was noted that crystalline silica and benzene are on the more hazardous list.

At the last meeting Lisa provided a presentation with some background, including exposures of carbon nanotubes and fibers (CNT/F) being observed in industry, to inform our threshold discussions on CNT and CNF which are used at much lower volumes. A matrix of existing HHS and the three endpoints noted above (IARC, LD50, and TLV) was provided for this meeting, as well as additional summary information on mesothelioma and biopersistence for CNT and CNF. Nano-C provided some additional comments as well. The discussion today is whether the Board will recommend designating any or all CNT/F as HHS based on their hazard.

One member commented that the matrix and information provided was helpful. One member said that the evidence doesn't seem to rise to the level of existing HHS-there is not much for multi-walled carbon nanotubes (MWCNTs) outside of the IARC rating. One member offered that for single walled and fibers the data to support raising it to HHS is not available.

A member pointed out that lack of data is not a satisfying reason to not give the HHS designation. A member offered that the Board could reevaluate in 3-5 years once more data are available.

Program staff noted that it is a long process for the program to get something listed as a higher hazard substance, so that is why many on the SAB's more hazardous list have not been designated as HHS. The program tries to focus on more hazardous chemicals that are used and help companies find safer alternatives.

One member offered that there is a strong statement from NIOSH on how they view the nano groups. “All types should be considered a respiratory hazard.” It was noted that these substances are so different from others on the HHS list that it is hard to compare them. For nano materials, such a small amount could result in an inhalation exposure or lung overload.

A member noted it makes sense to take nanomaterials seriously before people get a disease (i.e., before the epidemiological data is available).

Discussion continued around possibly classifying MWCNT-7 as HHS or classifying all MWCNT as HHS. It was noted that the only reason that the MWCNT-7 was designated with the IARC score was because it had data.

There was discussion around the suggestion to reassess in 3-5 years and whether the Board has the ability to petition for EPA or NIH to do the studies in order to fill this data gap. Program staff said that they were not aware of how to accomplish that, but the Board could offer that recommendation.

Concern was raised about how to be certain which species (e.g., MWCNT-7) of material is present in the manufacturing process. It was noted that all MWCNT are very resistant to environmental breakdown and sometimes functionalization can help. They are very persistent. They don't have a tendency to bioaccumulate. A question was raised about any mechanism to aerosolize these materials. The Board shared discussion around agglomeration in the environment versus the workplace.

### ***Opportunity for Visitor Comments***

There were no visitor oral comments. The Chair read one comment that was in the chat from Tom Lada that "speaking only for our SWCNT products, we analyze by SEM, and have analyzed hundreds of samples over the past 20 years or so. We do not see any MWCNT in our products."

A member shared concerns with being able to distinguish between the materials and noted they are comfortable treating them as a group of MWCNT. Particular concern for MWCNT-7 could be noted in the recommendation. Another member expressed comfort with MWCNT-7 but not the whole group. A member noted that the materials are a continuum of sizes and rigidities.

A motion was made to designate MWCNT-7 as HHS. There was no second. Subsequently a motion was made to recommend designating MWCNT (as a class) as HHS, and there was a second.

It was reiterated that HHS is a regulatory designation -it does lower the threshold (to 1000 pounds). The SAB's more and less hazardous lists are for guidance and do not have a regulatory impact.

A Board member reminded the group that there are studies that show mesothelioma and hazards for other MWCNTs (outside MWCNT-7). It was noted that the 25,000 pound default threshold is very high considering this material. There was discussion around usage and reporting, and how companies will be affected. Concerns were shared about the small users and safe use, because it only takes micrograms to cause effects in a mouse. That is still considerably less than even the 1,000 lb HHS threshold.

Vote - Ten in favor of recommending designating MWCNT as HHS and one opposed.

Discussion continued for SWCNT and CNF.

### ***Visitor Comments***

A visitor inquired about the overall process beginning with the SAB, then going to the Advisory Committee and then to the Administrative Council for a decision, and whether that process had changed given the Council's recent deliberations and vote on quaternary ammonium compounds. Program staff explained that the overall process had not changed.

A member made a motion to put SWCNTs and CNFs on the SAB's 'more hazardous chemicals' guidance list. There was a second. It was noted that there was a lack of info for CNFs, but there were similar concerns - pulmonary toxicity and resulting fibrosis was the main endpoint of concern.

The board voted unanimously in favor of the motion to add SWCNTs and CNFs to the SAB's "more hazardous chemicals" list.

## **MA Flame Retardants Law**

TURI presented the requirements of the [Massachusetts Flame Retardant Law](#) (“FR law”), pointing out the differences between the FR law and TURA. The FR law is a ban of, initially, 11 chemicals and their chemical analogues in certain covered products above threshold. The law requires MassDEP to consult with TURI and the SAB on the chemicals to be covered under the law. TURI has organized the 11 initial chemicals into seven subclasses (according to the National Academy of Sciences definitions), and researched analogues of the 11.

Today we are discussing analogues from two of the categories of flame retardants with regard to their similarities to chemicals in the law in the areas of toxic hazard, persistence, bioaccumulation. TURI identified the relevant hazard endpoints through databases and literature searches, policies/programs/statements about the category as a whole and explored EPA tools.

### *Subclass 2 – Polyhalogenated diphenyl ethers*

Penta- and octa-bromodiphenyl ether varieties are specified in the law and TURI/DEP are asking for Board input on the analogues (deca-, nona-, hepta-, hexa-, tetra-, di-, mono-bromodiphenyl ether) identified. TURI provided summary data of the identified hazard endpoints.

*DEP is asking for the board’s advice:* Is each proposed analogue (deca-, nona-, hepta-, hexa-, tetra-, di-, mono-bromodiphenyl ether) sufficiently similar to at least one chemical identified in the law (penta-, octa-bromodiphenyl ether) such that the proposed analogue would be reasonably anticipated to have similar concerns re: toxic hazard, persistence, bioaccumulation?

The Board discussed mixtures of these congeners and recognized that there are always a variety of congeners present in the mixtures. The Board discussed the Comptox data for BDEs. EPA Comptox data is a good screening tool and is helpful when other data is scarce or to supplement other data. The Board discussed similarities between various physical/chemical properties of all the analogs and talked about some differences between di-bromodiphenyl ether and mono-bromodiphenyl ether and the rest of the chemicals. The Board discussed whether there was enough data on the mono-bromodiphenyl ether and di-bromodiphenyl ether congeners to include them with the others. One member pointed out that it would be impossible to exclude mono-bromodiphenyl ether and di-bromodiphenyl ether, for example, from a mixture and that one would analyze it by looking only at total bromine. It was noted that all varieties have high and similar log Kow values, indicating bioaccumulation. Looking at the Ecotox data, the di-bromodiphenyl ether is in line with tri-bromodiphenyl ether and up. The mono-bromodiphenyl ether looks like it has significant toxicity to fish and low LC50s. The Cheminformatics table is in line with everything the Board has been discussing.

It was noted that mono-bromodiphenyl ether is currently on the TURA list but has never been reported. Board developed a summary statement: “Deca- to di-bromodiphenyl ether are reasonably anticipated to have similar concerns regarding toxicity hazard, persistence, and bioaccumulation to the original flame retardants (octa- and penta-bromodiphenyl ether) in the Massachusetts Flame Retardant Law. Mono-bromodiphenyl ether shows ecotoxicity concerns but likely has lower persistence and bioaccumulation. Also, mono-bromodiphenyl ether is likely to have higher brominated isomers in the mixture.”

**Visitor Comment**

There was an opportunity for visitors to make comments, and there were none.

**Next Meeting**

Heather will send out a When2Meet for a proposed meeting in early November.

**Substantive Zoom Chat Comments**

Jerome Lang 9:33 AM

Jerome Lang, Nano-C

Christina Bramante to Everyone 9:33 AM

Christina Bramante, representing Nano-C

Raza Ali to Everyone 9:33 AM

Raza Ali, American Chemistry Council

Terry Hyland to Everyone 9:34 AM

Terry Hyland, Chemical Watch

Laura Spark, Clean Water Action to Everyone 9:34 AM

Laura Spark, Clean Water Action

Robert Rio - RAR Strategies to Everyone 9:34 AM

Robert Rio - RAR strategies LLC

Kari Sasportas (MA OTA) to Everyone 9:34 AM

Kari Sasportas - MA OTA

Kuper Jones to Everyone 9:37 AM

Kuper Jones, American Chemistry Council

Katherine Robertson to Everyone 9:37 AM

Katherine Robertson, MCTA

Tom L to Everyone 9:38 AM

Tom Lada - Nano-C

Carol Holahan to Everyone 9:39 AM

Carol Holahan, Foley Hoag

Sarah Mattalian to Everyone 9:59 AM

Sarah Mattalian, Inside EPA

Tom L to Everyone 10:15 AM

Speaking only for our SWCNT products, we analyze by SEM, and have analyzed hundreds of samples over the past 20 years or so. We do not see any MWCNT in our products.

Christina Bramante to Everyone 10:21 AM

No further comment from Nano-C

Christina Bramante to Everyone 10:42 AM

US OSHA requires the disclosure of a carcinogen present at 0.1% or greater on the Safety Data Sheet. Nor is carbon black on the list

Christina Bramante to Everyone 10:51 AM

Please know Nano-C does not manufacture MWCNT which is under discussion

Christina Bramante to Everyone 11:02 AM

Data has demonstrated that nanomaterials/nanoparticles are not inherently hazardous.

Christina Bramante to Everyone 11:20 AM

Nano-C would like to thank you very much for our ability to participate in this process. Many thanks to the SAB for the thoughtful manner by which they addressed this petition.

Tom L to Everyone 11:20 AM

I'd like to second Christina's appreciation for the opportunity to participate. Your thoughtful consideration over the past 2+ years has been excellent.

Heather Tenney to Everyone 11:24 AM

Thank you Nano C (all) for your thoughtful participation.

Wendy Heiger-Bernays (she/her) to Everyone 12:25 PM

I too have to go to another meeting. I support the statement as written.

I have similar concerns regarding toxicity, persistence and bioaccumulation with the mono though deca brominated flame retardants.

Sandra Baird (MassDEP) 12:30 PM

Toxic hazard is defined in the regulation includes, bioaccum, persistence and toxicity