

**Toxics Use Reduction Institute Science Advisory Board Meeting Minutes**  
**May 20, 2021**  
**Virtual Zoom Meeting**  
**12:00 PM**

**Members Present:** Dave Williams (Chair), Robin Dodson (Vice Chair), Christy Foran, Christine Rioux, Heather Lynch, Rich Gurney, Helen Poynton, Wendy Heiger-Bernays, Lisa Cashins

**Members not present:** Amy Cannon, Denise Kmetzo

**Program staff present:** John Raschko (OTA), Liz Harriman (TURI), Heather Tenney (TURI), Hayley Hudson (TURI), Tiffany Skogstrom (OTA), Caredwen Foley (OTA), Michael Ellenbecker (TURI), Pam Eliason (TURI)

**Others present:** Katherine Robertson (MCTA), Carol Holahan (Foley Hoag for ACC), Trisha McCarthy (Coyne PC for ACC), Harry Hechehouche (ACC), Kenneth Littel (ADBAC/DDAC ISCs), Aron Pollard (Mason Chemical Company), David Jones (ISC ADBAC/DDAC, Lonza LLC), Hannah Alleman (Household & Commercial Products Association's Ignite Solutions), Kate Sande (Ecolab), Carol Kwiatkowski, Anna Soehl, Laura Spark (Clean Water Action)

**Welcome & Introductions**

The chair made an announcement acknowledging that this meeting is being conducted remotely, consistent with Governor Baker's Executive Order of March 12, 2020, in response to the current State of Emergency in the Commonwealth due to the outbreak of the 2019 novel coronavirus, known as, "COVID-19."

All board members were asked to introduce themselves. All attendees were also asked to introduce themselves and state their affiliation using the chat function. Visitors were asked to then mute and it was noted that there would be time for visitor questions and comments after board discussion and before a vote.

**Approve March 11<sup>th</sup> Meeting Minutes**

A motion was made to approve the March 11<sup>th</sup> meeting minutes. The minutes were unanimously approved by the nine board members in attendance.

**Program Updates**

A few key highlights were summarized.

- Dan Sieger is leaving as Undersecretary for the Environment at EEA and we welcome Beth Card as new Undersecretary.
- Marina Gayle has retired from OTA.
- TURI recently had a virtual demonstration event showcasing CD Aero's successful solvent substitution process - [Watch the webinar](#)
- TURI's Virtual Spring Continuing Education Conference – [View presentations and materials](#)
- TURI finished a video on the health and safety of Nanomaterials, it is not on the website yet and today will be its first premier.
- TURI grants are available for industry, community, research, and small business.

### ***Quaternary Ammonium Compounds***

Today our meeting is again focused on Quaternary Ammonium compounds, with a vote planned.

We are finalizing our review of the scientific data for quaternary ammonium compounds as a potential listing under TURA. The SAB is completing review of the science related to the EHS effects and will make a recommendation. From there, TURI creates a policy analysis that is presented at the Advisory Committee and the Administrative Council. The policy analysis includes the scientific recommendation as well as policy information such as expected use in Massachusetts, TUR opportunities, other regulations in place, and implications for the TURA program.

Should the Administrative Council vote to list a substance there is then a regulatory process including draft regulations and public comment. Also, note that listing under TURA does not limit the use of a substance but rather requires reporting of the substance and development of a TUR plan for the substance.

EHS summaries have been updated, and updates are in red. There were a few new studies which were added to the LibGuide since the last meeting as well as the CAS list of ADBAC and DDAC substances. ADBAC ISC provided comments the ADBAC EHS summary right before the last meeting. Similar comments for the DDAC EHS summary came in right after the last meeting. Those are noted in the Information from Stakeholders box on the LibGuide.

Heather shared her screen so the board member summary comments from the last meeting were visible.

#### ***Environmental Endpoint:***

A board member summarized several studies and other key concerns that were discussed last meeting and the new studies that were reviewed.

A study from Korea that tested surface water samples to conduct a risk analysis and derived a hazard quotient was summarized by a board member.

#### ***Corrosivity/Worker Health:***

Concern with corrosion: irritation and serious eye damage listed as GHS Category 1 on multiple SDS; skin corrosion; irreversible damage from more concentrated formulations.

#### ***Asthma:***

Evidence in case reports, surveillance studies, and animal studies indicate that QACs (ADBAC and DDAC) are associated with respiratory system irritation and inflammation including those outcomes consistent with occupational asthma and work-exacerbated asthma. Epidemiologic evidence is suggestive with limitations in terms of exposure characterizations (mixtures vs individual QACs), and study population (exclusion of most vulnerable persons or distinguishing between new-onset vs prior asthma).

#### ***Reproductive:***

The board discussed the mixed results on this endpoint. The Hrubec and Melin studies show effects on fertility, but guideline studies do not show these same effects. The board remains concerned for reproductive effects and neural tube development, but would like to see additional studies.

### ***Timing of Neural Development:***

Note lipid and sterol biosynthesis importance in brain and spinal cord development; potentially disrupted/impacted. Neurogenesis and neural system development and timing.

- Based on available data from guideline and academic studies there is some concern for early neural developmental effect; no evidence for frank defect.
- Some of these effects may be supported by potential endocrine activity in screening assays in addition to mechanistic studies, [like Xu which is in vitro].
- Herron notes that it can pass blood brain barrier, alters cholesterol biosynthesis, liver x receptor-retinoid-X and glutamate receptor signaling.

### ***Category Decision***

The board decided that they would make a recommendation on one category; combining ADBAC and DDAC for a total of 19 CAS numbers. They based this on the similarity of the effects and the fact that most of the information they have reviewed was a mix of the two substances.

### ***The chair opened up the discussion to visitors***

- No hands were raised or questions asked. The raise hand function was tested to make sure it was working properly.

### ***Discussion***

At this time the board discussed the overall weight of evidence for each category to get a consensus about each outcome and determine if it will be considered a basis for listing, not a basis for listing, or just as an additional concern.

- Asthma should be a basis for listing - evidence is strong.
- Corrosivity and worker health concern - basis for listing.
- Hazard to aquatic life reason for listing, significant adverse effects on environment due to toxicity for aquatic life, persistence and concerns with environmental fate as a reason for listing, with potential concerns regarding food chain.
- Reproductive and neural tube development is a real concern but data are lacking – board members expressed their concerns for new data as this is a very important endpoint. This should be translated in any guidance to companies that are using these chemicals.
- A board member expressed concerns for QAC residue on produce and found studies that report findings on oranges, cucumbers, baby formula, and wheat.

***Motion: SAB Recommends listing QACs as listed in the Environmental Protection Agency's Final Work Plans (19 CAS: 14 ADBAC, 5 DDAC) on TURA list due to respiratory system irritation and inflammation including those outcomes consistent with occupational asthma and work-exacerbated asthma; corrosivity; hazard for aquatic life, environmental fate and persistence. The SAB also has additional concerns for reproductive effects and neural tube development.***

There was a second. Heather called a roll call vote and the motion was unanimously approved.

**There was a 10 minute biobreak until 2:25.**

## ***Nanomaterials***

Heather played TURI's Nanomaterial Safety video and then shared her screen to make the nanomaterials petition visible. Heather and Hayley walked through the petition noting important materials and providing a brief overview of specific endpoints of concern.

## ***Next meeting***

Before the next meeting all the Carbon nanotube and carbon nanofiber documents talked about today will be added to the LibGuide. There is a lot of information so the plan is to review a few studies for each endpoint for the next meeting. A board member suggested trying to separate or group information, by single walled versus multiwall. It can get tricky, but we will do our best to try and organize the material in that way.

Heather would like to set up a meeting for late June, and will send out a doodle poll to find a date that works. We will also keep track of the state of emergency and give an update if we are notified it has been lifted and how that might affect our public meetings.

A motion to adjourn was approved.

## ***Handouts***

All handouts were posted on the TURI website prior to the meeting.

- QAC Research Bibliography
- Nanomaterials Petition
- DRAFT ADBAC EHS Summary
- DRAFT DDAC EHS Summary
- DRAFT March Meeting Minutes
- Member Summary Comments from March Meeting
- Appendix C: SAB Decision Making Document
- Summary of CompTox Results
- ADBAC ISC Provided Comments on DDAC EHS Summary
- DDAC/ADBAC CAS List

## ***Chat Box Conversation (copied verbatim from Zoom chat)***

12:04:42 From Liz Harriman: Welcome! we are giving another minute for board members to arrive and will then open the waiting room.

12:08:49 From Caredwen Foley, MA OTA: Caredwen Foley, MA OTA

12:08:56 From Hannah Alleman (HCPA - Ignite Solutions): Hannah Alleman - Household & Commercial Products Association's Ignite Solutions Program

12:09:05 From Carol Holahan: Carol Holahan Foley Hoag

12:09:06 From DAVID JONES: David Jones, ISC ADBAC/DDAC, Lonza

12:09:10 From Amine Hechehouche: Harry H. ACC Northeast

12:09:47 From Katherine Robertson, MCTA : Katherine Robertson, MCTA

12:09:56 From Tiffany Skogstrom: Tiffany Skogstrom, TURA Administrative Council Executive Director and OTA Director

12:10:08 From Aron Pollard: Aron Pollard, ADBAC/DDAC ISC - Pilot Chemical Company

12:14:08 From The Sandes: Kate Sande- Director, Regulatory Affairs, Ecolab

12:49:37 From Boston - Heather Lynch: For guideline study on DDAC: No DDAC-related effects on mating, fertility, gestation, fecundity, delivery, or pre- or post-natal pup development were reported at any concentration for either generation. (CIT 2008).

12:53:47 From Boston - Heather Lynch: In a two-generation reproductive toxicity study that adhered to OCSPP 870.3800 (BRRC, 1991g, as cited in Luz, 2020) no specific reproductive toxicity was observed.

12:56:24 From Robin Dodson: Melin et al. 2014: Breeding pairs exposed for six months to a QAC disinfectant exhibited decreases in fertility and fecundity: increased time to first litter, longer pregnancy intervals, fewer pups per litter and fewer pregnancies. Significant morbidity in near term dams was also observed.

13:04:03 From Laura Spark, CWA Massachusetts: I need to leave for a 1:00 call. Thank you for including me. I look forward to summary/decision on quats and beginning of discussion on nano-materials.

13:06:29 From Rich Gurney (he, his): Environmental effects in specific aquatic organisms seen in low microgram per liter concentrations. Wastewater treatment effluent and some surface water concentrations approach these levels. Though QACs are removed during conventional wastewater treatment these compounds are still detected in aquatic environments, especially at higher concentrations in locations downstream of the discharge of municipal WWTP effluents and hospital and industrial effluents. Wastewater treatment can't handle plugs and disrupt bioreactors and cause downstream effects. Perhaps of greatest concern is the proliferation of pathogenic multidrug resistant bacteria following exposure to QACs in soils treated with WWTP effluents. Methicillin-resistant *Staphylococcus aureus* (MRSA) strains exposed to BAC as well as benzethonium chloride had increased resistance to oxacillin and  $\beta$ -lactam antibiotics. *Salmonella enterica* and *Escherichia coli* O157 exposed to BAC also developed cross-resistance to antibiotics.

13:06:37 From Rich Gurney (he, his) : Concerns have prompted the development of multiple detection methods for environmental contamination and QAC have been detected in vegetables in Guangzhou, China (23-180  $\mu\text{g}/\text{kg}$ ), in sewage sludge samples in Mexican soil (38600  $\mu\text{g kg}^{-1}$  in sewage sludge and up to 81  $\mu\text{g kg}^{-1}$ ), and in Austrian rivers water samples with high loads of suspended solids showed QAC concentrations above 1mg/L (BAC-C12, BAC-C14, DDAC-C10, DDAC-C18) but median values below 100 ng/L.

13:08:47 From Robin Dodson: OEHHA QAC:

<https://biomonitoring.ca.gov/sites/default/files/downloads/PotenDesigQACs030420.pdf>

13:11:35 From Wendy Heiger-Bernays: The CompTox data provide evidence to suggest that multiple QACs can impact the ability of cells to synthesize/metabolize/transport lipids and cholesterol. These data showing/suggesting the effects of QACs on lipid and cholesterol homeostasis through activation/inhibition of binding and activity of relevant receptors and transcriptional factors.

13:57:40 From Rich Gurney (he, his): Cyanuric chloride-imidazole dendrimer functionalized nanoparticles as an adsorbent for magnetic solid phase extraction of quaternary ammonium compounds from fruit and vegetable puree based infant foods

Quick View Other Sources

By Zhao, Tangjuan; Zhang, Mengyan; Ma, Ling; Ma, Li; Shi, Hongmei; Kang, Weijun; Xu, Xiangdong  
From *Journal of Chromatography A* (2021), 1636, 461735.

13:58:24 From Rich Gurney (he, his): Phytotoxicity and oxidative effects of typical quaternary ammonium compounds on wheat (*Triticum aestivum* L.) seedlings

By Li, Yafei; Zhou, Can; Wang, Shizhong; Lin, Qingqi; Ni, Zhuobiao; Qiu, Hao; Morel, Jean Louis; Qiu, Rongliang

From *Environmental Science and Pollution Research* (2019), 26(25), 25985-25999

13:59:46 From christine rioux: For motion, can we say "respiratory system irritation and inflammation including those outcomes consistent with occupational asthma and work-exacerbated asthma"

14:00:20 From Rich Gurney (he, his): Determination of quaternary ammonium compounds in oranges and cucumbers using QuEChERS extraction and ultra-performance liquid chromatography/tandem mass spectrometry

By Arrebola-Liebanas, Francisco Javier; Abdo, Maria Angeles Herrera; Moreno, Jose Luis Fernandez; Martinez-Vidal, Jose L.; Frenich, Antonia Garrido

From Journal of AOAC International (2014), 97(4), 1021-1026

14:15:26 From Katherine Robertson, MCTA: when is public comment?

14:24:40 From Pam Eliason, TURI: let's do a "name the narrator" poll

14:36:03 From Robin Dodson: Great job narrator Pam!