Toxics Use Reduction Institute Science Advisory Board Meeting Minutes
April 29, 2024
Virtual Zoom Meeting
10 AM

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

Members not present: Wendy Heiger-Bernays, Helen Poynton

Program staff present: Liz Harriman (TURI), Heather Tenney (TURI), Karen Thomas (TURI), Hayley Hudson (TURI), Gabriel Salierno (TURI), Greg Morose (TURI), Caredwen Foley (OTA), Sandra Baird (MassDEP), John Raschko (OTA)

Others present: Katherine Robertson (MCTA), Owen Jappen (ACC), Erin DeSantis (ACC), Carol Holahan (Foley Hoag LLP)

Welcome & Introductions

The chair noted that this meeting is being conducted remotely, consistent with *An Act Relative to Extending Certain State of Emergency Accommodations* signed by Governor Baker on June 16th, 2022. This allows the extension of the remote meetings under the Open Meeting Law until March 31, 2025. Board members and program staff were introduced, and visitors were asked to put their name and affiliation in the chat.

Approve February Meeting Minutes

There was a motion to review the February meeting minutes and there was a second. The minutes were available for review prior to the meeting. A member pointed out a typo on page 4 of “organophosphates” and that was corrected. The minutes were unanimously approved by the members present.

Chlorinated Paraffins

- TURI reviewed what the Board has accomplished regarding subclasses of flame retardants
- Short chain chlorinated paraffins (SCCPs) are known by many names, e.g., “chlorinated alkanes, C10-C13.”
- They have never been reported under TURA
- Persistence, bioaccumulation, aquatic toxicity and carcinogenicity are the properties of possible concern for this subclass

- TURA is proposing medium chain chlorinated paraffins (MCCPs) and long chain chlorinated paraffins (LCCPs) as analogues to SCCPs.
- SCCPs, MCCPs and LCCPs are all 40-70% chlorine by weight and exist as a mixture of chain lengths. General chain lengths are SCCP = C10-C13, MCCP = C14-C17, LCCP = C>17.

Question 1 for the Board: **Are MCCPs and LCCPs analogues to SCCPs?**

One member offered that these would all have similar solubility and there is no reason to think that they are not analogues of one another. One member asked if the long chain is limited to C20 or is it open ended? TURI offered that there are varying definitions with regard to chain lengths for LCCPs and some studies look at a specific chain length (e.g., C20) and then the results are grouped with the more general long chain chlorinated paraffins (i.e., C>17). After a short discussion and mention of all three groups existing as mixtures, the Chair asked if there were visitor comments. None were offered.

The Board agreed that MCCPs and LCCPs are analogues of SCCPs according to the DEP definition of analogue.

Question 2 for the Board: **Are both proposed paraffin analogues (specifically, MCCPs and LCCPs) sufficiently similar to the included flame retardant, SCCP, that they would be reasonably anticipated to have similar concerns re: toxic hazard, persistence, bioaccumulation?**

TURI reviewed the global regulatory history of the chlorinated paraffins. TURI referred to the EHS Summary provided before the meeting and shared a summary table of data for short, medium, and long chain and opened it up for discussion.

Discussion

One member offered that the evidence exists that all groups are similar for persistence and for bioaccumulation, though the bioaccumulation data are somewhat challenging to understand. Other members offered agreement on the persistence and bioaccumulation endpoints showing similar behaviors.

The Board discussed the aquatic toxicity data. Especially with SCCPs and MCCPs there are similarities but the LCCPs were missing data and the read-across from MCCPs to LCCPs is perhaps less convincing. Members discussed solubilities of the three groups and noted the lack of data for the LCCPs especially and the relatively high aquatic toxicity of the SCCPs.

It was noted that the MCCPs and LCCPs will likely have SCCP contamination to some degree. On exposure to sunlight or ozone the MCCPs and LCCPs may break down into SCCPs but those bonds will not break easily. The Cl-C bonds are more easily radicalized.

The Board discussed the UK document and potential reproductive effects of the MCCPs, including hemorrhaging and death amongst pups. They discussed the dose response of the study and noted it was more of a bell curve.

TURI offered that this information was not included in the toxicity summary because the question is about comparison of the MCCPs and LCCPs to the SCCPs and TURI did not find any information about reproductive effects for SCCPs and LCCPs. If the Board wants to look at MCCPs separately for TURA, these data would be included.

One member explained that these paraffins are essentially very small PVC molecules that will blend very well with PVC. The long chains will tend to stay in the polymer and the short would be more likely to leach out. Their potentially problematic chlorinated compound combustion products were considered, e.g., PCBs.

The SCCPs and MCCPs are more likely than LCCPs to be in the airborne phase. LCCPs are more likely to be in dust. They are very hard to measure in air and dust, particularly the longer they get.

The Chair asked if there were visitor comments. None were offered.

The Board began work on a summary statement to provide as advice to DEP for the Flame Retardant law.

Paraffins Summary Statement

- There was agreement from the Board that MCCPs and LCCPs are analogues to SCCPs. Short, medium and long chain chlorinated paraffins are anticipated to have identical intermolecular forces irrespective of the length and can be reasonably considered analogues.
- Various paraffin lengths are present in commercial mixtures. Mixtures of chlorinated n-alkanes are produced by reacting normal paraffin fractions obtained from petroleum distillation with gaseous chlorine exothermically at 80–120°C in the liquid phase (Chlorinated Paraffins Industry Association, 1988). Synthesis of pure isomers is not at all typical of manufacturing processes.
- Since the SCCPs were included in the Stockholm Convention in 2017, the production of MCCPs and LCCPs has increased as alternatives (Liao, 2023).
- Persistence is a concern for all three groupings SCCPs, MCCPs, and LCCPs.
- Chain length and amount of chlorination affect bioaccumulation, chlorinated paraffins in each grouping are bioaccumulative.
- While MCCPs have lower predicted ecotoxicity, they have higher predicted persistence in soil (in one meta study Kobeticova, 2018).
- There is a lack of data regarding toxicity on LCCPs.

- Data are lacking to assess whether MCCP and LCCP will have similar carcinogenic effects seen in SCCPs.

Predictive Tools Presentation

TURI shared the predictive toxicology tools that were used to obtain data for the study of flame retardant subclasses.

- CompTox – includes 5 flame retardant lists with 200-800 chemicals
- CompTox – GenRA – predicts structural analogues, in vivo toxicity, in vitro bioactivity
- CompTox – Physical and Chemical Properties – most data are predicted
- CompTox – ToxValDB – data from 34 sources, e.g., NOAEL
- CompTox – ToxCast – in vitro screening assays
- CompTox – # of PubMed articles – some idea of how much data one could expect to find
- Cheminformatics – simple and visual, but it is in beta version and not perfect. Does not prioritize screening level sources. The order for scoring: authoritative, screening, QSAR.
- Episuite – BIOWIN – 7 models to verify the predictions with either "YES" or "NO" for "readily biodegradable." Tool has many, many more predicted endpoints.
- OECD Toolbox - QSAR

No tool was perfect, and they are all evolving. The Board did not rely on any one tool and expert judgement is required. Will continue this discussion at the next meeting.

Adjourn

There was a motion to adjourn and there was a second. The meeting was adjourned.

Handouts

Proposed FR CAS numbers, Isomers and Analogues for SAB Consideration, updated version 5.4.23
FR Questions and Definitions
TURI Presentation from February Meeting
Draft February Minutes for Board Review
ACC-NAFRA Comments MA TURA SAB
EHS Summary Chlorinated Paraffins
ECHA 2008: Support doc for SVHC recommendation for SCCPs
ECHA 2021: Support Document for Identification of Medium-Chain Chlorinated Paraffins as Substances of Very High Concern

EPA 2015: TSCA New Chemicals Review Program Standard Review Risk Assessment on MCCPs and LCCPs
NAS 2000: Tox info chlorinated paraffins
IARC 1990: Evaluation of Carcinogenic Risks to Humans Some Flame Retardants and Textile Chemicals
Kobeticova 2018: Ecotoxicity of SCCPs and MCCPs
NTP 1989: Report on Carcinogens, CAS No. 108171-26-2
NTP 1986: Carcinogenicity and Toxicity of C23 Chlorinated Paraffins
Stockholm Convention on POPs 2016: Report of the Persistent Organic Pollutants Review Committee on the work of its twelfth meeting
Stockholm Convention on POPs 2023: Draft risk management evaluation: chlorinated paraffins with carbon chain lengths in the range C14–17 and chlorination levels at or exceeding 45 per cent chlorine by weight
ECHA 2019: Substance Evaluation Conclusion for MCCPs
UK Environment Agency 2022: Long Chain Paraffins PBT properties
UNEP Stockholm Convention 7th meeting 2011: Case study on toxicological interactions of chlorinated paraffins

Zoom chat (inserted verbatim)

Owen Jappen 10:03 AM

Owen Jappen - American Chemistry Council

Raza Ali to Everyone 10:03 AM

Raza Ali, American Chemistry Council

Katherine Robertson to Everyone 10:03 AM

Katherine Robertson, MCTA

Gabriel Salierno to Everyone 10:04 AM

Gabriel Salierno, Toxics Use Reduction Institute

Sandra Baird (MassDEP) to Everyone 10:04 AM

Sandra Baird, MassDEP

Gabriel Salierno to Everyone 10:45 AM

When a substance exhibits significant bioaccumulation, evaluating its toxicity at relevant exposure levels is crucial. Higher dose testing can be informative in understanding potential chronic effects at lower environmental concentrations.

Rich Gurney (Simmons U) to Everyone 10:56 AM

Short, medium and long chain chlorinated paraffins are anticipated to have identical intermolecular forces irrespective of the length and can be reasonably considered analogs. Mixtures of chlorinated n-alkanes are produced by reacting normal paraffin fractions obtained from petroleum distillation with gaseous chlorine exothermically at 80–120°C in the liquid phase (Chlorinated Paraffins Industry Association, 1988). Synthesis of pure isomers is not at all typical of manufacturing processes.

Lisa Cashins MA Consultation to Everyone 11:23 AM

Since the small chain chlorinated paraffins were included in the Stockholm Convention in 2017, the production of medium and long chained has seen to be increased as alterative substances (Liao et al, 2023).

Lisa Cashins MA Consultation 11:38 AM

Humans are exposed to environmental chlorinated paraffins through dietary intake, inhalation, dust ingestion and dermal contact (Jing-Wen Huang et al, 2023). (not sure if needed)