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CSM

Chemical Sensitivities Manitoba

Submission Regarding: Proposed Approach to Regulatory Amendments to the Prohibition of Certain Toxic Substances Regulations, 2012 in consideration of the draft Screening Assessment for Substituted Diphenylamine (SDPA) Substances

Email: ec.interdiction-prohibition.ec@canada.ca February 21, 2017

Please consider the following comments and recommendations by Prevent Cancer Now (PCN), and Chemical Sensitivities Manitoba (CSM), in response to the Environment and Climate Change Canada consultation document: Proposed Approach to Regulatory Amendments to the Prohibition of Certain Toxic Substances Regulations, 2012 in consideration of the draft Screening Assessment for Substituted Diphenylamine (SDPA) Substances[1] and Environment and Climate Change Canada and Health Canada, 2016: Draft Screening Assessment for Substituted Diphenylamines (Canada Gazette Part 1: Vol. 150, No. 50, December 10, 2016).[2]

The comments and recommendations focus on:

- Scientific process and data validity, including as illustrated for BNST, one of the SDPAs, as it is being proposed that they are not harmful to the environment or public health; and
- Selection of chemicals for groupings and the process for the draft assessment of SDPAs.

Overall, the majority of the findings are based upon computer modeling of physical and biochemistry. We note that computer modeling is also available for cellular signaling such as endocrine disruption; an important and potentially relevant outcome that was not assessed. That said, computer modeling is not well established as reliable, and empirical data is essential. Given that some confidential data submitted recently was based on unreliable experimental methods, and some included data was of very poor quality, we do not have confidence that the “CEPA Toxic” and bioaccumulation designations should be overturned for BNST. Reference to data on fish flesh concentrations that are not lipid-normalized further undermines confidence that bioaccumulation was appropriately measured.

[1] Environment and Climate Change Canada (ECCC). 2016. Proposed Approach to Regulatory Amendments to the Prohibition of Certain Toxic Substances Regulations, 2012, in consideration of the Draft Screening Assessment for Substituted Diphenylamine (SDPA) Substances. http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=B524FBB5-1

[2] Environment and Climate Change Canada (ECCC) and Health Canada. 2016. Draft Screening Assessment for Substituted Diphenylamines: http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=2622BEC7-1

That said, the original BNST designation was based upon a limited, primarily modeled data set. With little experimental evidence and some evidence of use of experimental methods to minimize outcomes of concern, neither do we have knowledge of whether potential substitutes will be better or worse.

This assessment demonstrates that clearer guidelines are needed for:

- grouping of chemicals for read-across assessments and subsequent use as analogues;
- grouping of chemicals for analyses of substitutes; and
- clear, stringent, enforced requirements for high quality data, as well as measures for the oversight of environmental laboratories.

Background

The Canadian Environmental Law Association (CELA) and CSM previously responded to the government on BNST with submissions on the following:

- Draft Risk Assessments for the Chemicals Management Plan Industry Challenge Batch 4 Substances (published in Canada Gazette Part I, Vol. 143, No. 4 — January 24, 2009) including BNST,[3]
- The Proposed Risk Management Approach for Chemicals Management Plan Industry Challenge Batch 4 Substances (published in Canada Gazette Part I, Vol. 143, No. 31 — August 1, 2009) including proposals to manage;[4] and
- The "Proposal to permit on-going use of BNST under the Prohibition of Certain Toxic Substances Regulation" (2016).[5]

The Canadian Environmental Law Association (CELA) and CSM supported regulatory measures to prohibit BNST (CAS RN 68921-45-9), a UVCB (Unknown or Variable Composition, Complex Reaction Products, or Biological Materials), based on the final 2009 assessment. BSNT was determined to be CEPA toxic; it also met the criteria in the Persistence and Bioaccumulation Regulations. Modelling of two representative structures, $C_{20}H_{27}N$ and $C_{28}H_{35}N$, was used to derive the properties of BNST. In 2013,

[3] Canadian Environmental Law Association and Chemical Sensitivities Manitoba. 2009. Chemicals Management Plan Industry Challenge Batch 4 Substances (published in Canada Gazette Part I, Vol. 143, No. 4 — January 24, 2009. http://www.cela.ca/sites/cela.ca/files/647_Draft%20CMP%20Batch%204.pdf

[4] Canadian Environmental Law Association and Chemical Sensitivities Manitoba. 2009. Proposed Risk Management Approach for Chemicals Management Plan Industry Challenge Batch 4 Substances (published in Canada Gazette Part I, Vol. 143, No. 31 — August 1, 2009. http://www.cela.ca/sites/cela.ca/files/676CELA%20and%20CSM%20Batch%204%20FIN%20RA%28%20Sept%2030%2009%29.pdf

[5] Canadian Environmental Law Association and Chemical Sensitivities Manitoba. 2016. A response to Proposal to permit on-going use of BNST under the Prohibition of Certain Toxic Substances Regulation http://www.cela.ca/sites/cela.ca/files/CSM-CELA-amendments-mgmt-BNST.pdf

BNST was added to the Prohibition of Certain Toxic Substances Regulations (Prohibition Regulations), but the prohibition included exemptions.

At present, BNST is being grouped with other SDPAs (discrete and UVCB substances), as new information regarding BNST has become available, and its usage has declined. There are seven discrete substances and seven UVCB substances, with some of the UVCBs having chemical structures that are the same or analogous to discrete SDPAs in the assessment.

In general, substances identified as UVCBs pose challenges for assessment. In the draft SPDA assessment, four BNST substances have the same CAS RN: Monostyrenated DPA $C_{20}H_{19}N$, Monooctyl DPA $C_{20}H_{27}N$, Dioctyl DPA $C_{28}H_{43}N$, and Monooctyl monostyrenated DPA $C_{28}H_{35}N$[6]; Monooctyl DPA and Dioctyl DPA are also listed as discrete substances. Thus, chemical structural descriptions and compositions of UVCBs are not well defined, which can lead to difficulties with the generation of representative structures. Even once representative chemical structures are identified, hazard assessment of these structures and mixtures faces inevitable uncertainties and inaccuracies in *in silico* and/or experimental data, and there are limitations when attempting to use read-across methods and determine the most appropriate analogues.

The draft assessment for the SDPAs has proposed that they are not harmful to human health or the environment. Therefore, BNST is no longer considered to be CEPA toxic; it is persistent but no longer thought to bioaccumulate.[7] As a result, there are new proposed risk management options for BNST.

Of note, 10s of millions of kilograms annually of BNST and other SDPAs are in Canadian commerce. These chemicals are used as antioxidants in oils and plastics.

Comments & Recommendations

1) BNST – inclusion in the current assessment of substituted diphenylamines (SDPAs)

BNST was assessed in the Challenge Program, but its similarity to the structures of some other SDPAs to be assessed (not in the Challenge Program) could have warranted earlier consideration of a group approach for the assessment of these substances, as a means to address potential substitutes as well as efficiencies. There are no indications in the current draft assessment of the SDPAs outlining why this approach was not initially considered.

[6] Environment and Climate Change Canada and Health Canada. Draft Screening Assessment for Substituted Diphenylamines. December 2016.
http://www.ec.gc.ca/ese-ees/2622BEC7-8E4F-44DA-83DC-BCA986A6BB3C/EN%20DSAR%20SDPA.pdf
[7] Ibid.

A significant amount of empirical and modeled data is presented in the draft assessment for SDPAs, compared with the final assessment for BNST.

We are not convinced that the reversal of bioaccumulation findings using confidential, recently measured concentrations of BNST and other SDPAs is merited. The assessment highlights that data generated in several studies was not accepted as reliable, and that other data was considered in a limited fashion. For example, in section 6.1 using isopropanol to extract these persistent, lipophilic compounds was not accepted, but the actual acceptable solvent(s) and methods were not stated.[8] Other comparable solvents (e.g. alcohols such as methanol, ethanol, N-propanol, butanol) would also be ineffective, and are not noted in methods such as presented by Dionex in the UK and EU [9] or Thermoscientific.[10] As well, concentrations in fish flesh are noted, but persistent lipophilic chemicals should be reported on a lipid-normalized basis. It is surprising to one versed in this field that these deficiencies would occur, short of attempts to under-estimate concentrations. Without methodological and analytical details and data, measures in place to ensure rigorous, reliable, verifiable results from commercial laboratories, and some government and independent (e.g. academic or government) data for verification, we have little confidence that the more recent findings should be used to overturn historical findings indicating that BNST has the potential to accumulate and cause harm to aquatic and terrestrial organisms.

Current information on the usage of BNST in products indicates a downtrend; that is to be expected for a chemical slated for phase-out. Should that phase-out be reversed, as is presently proposed for BNST, we expect that the trend will be reversed as well. All told, we cannot agree that there is little concern for human exposure to BNST and other SDPAs.[11]

The draft assessment of SDPA substances presents the following weaknesses and gaps:

1) The draft risk assessment concluded that the SDPAs are not CEPA toxic; however, BNST, included in the SDPA grouping, was initially assessed as being CEPA toxic, persistent (P), and bioaccumulative (B). The synopsis omitted that these substances, including BNST, are proposed to be persistent but not bioaccumulative. Thus, risk management of BNST may have to be amended, depending on the final risk assessment of the SDPAs.

[8] Environment and Climate Change Canada. Draft Screening Assessment for Substituted Diphenylamines. December 2016 http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=2622BEC7-1 Section 6.1
[9] Extraction of POPs from Environmental Samples using Accelerated Solvent Extraction (ASE®).
[10] ThermoScientific. Accelerated Solvent Extraction. Environmental Applications Summary. Pesticides • Chlorinated Compounds • Persistent Organic Pollutants (POPs). https://static.thermoscientific.com/images/D22227~.pdf
[11] Ibid.

Care is needed in writing summary documents to flag important changes, particularly since BNST now has a change in its bioaccumulation and toxicity finding.

2) An important use of SDPAs is as a preservative in mechanical oils. Dermal exposure was not considered significant, but was not scoped with sufficient data relevant to occupational settings. Dermal absorption of oils and additives may actually be significant, more so with professional vehicle maintenance than with occasional DIY oil changes. As well, might babies and toddlers sucking on plastics ingest SDPAs?

   Overall, the exposure assessment should encompass broader scenarios and be more rigorously substantiated.

3) Many thousands of tonnes of SDPAs are manufactured and used annually in Canada, and yet astonishingly, the assessment contains very little actual measured physical chemistry parameters. Moreover, the fundamental parameter, vapour pressure, is calculated in a circuitous manner, from the Henry's Law Constant and solubility (Appendix A).

   Actual measured basic physical chemical parameters are routine laboratory determinations, and should be required, particularly for high volume chemicals. These could even contribute to the ongoing validation of the modeled values.

4) The diphenylamine central moiety is common to all chemicals in this grouping, but there may be different toxicological implications of additional aromatic rings.

   Consideration should be given to the grouping and assessing of aliphatic-substituted diphenylamine chemicals apart from those with additional aromatic R-groups.

5) Chemicals that are grouped should have similarities beyond a central structure. The physical chemistry properties of the SDPAs vary widely – for instance, the modeled Henry's Law Constants range over many orders of magnitude, indicating wide ranges in solubility and volatility. Despite the low volatility and low water solubility, fundamental differences challenge the wisdom of the grouping of this complete range of chemicals.

   Similarities in physical chemical properties should be considered when grouping chemicals. Guidance for chemical groupings for assessment should be developed and scientifically validated.

6) At least fifty-five (55) studies are referenced as unpublished confidential submissions or voluntary submissions of data, submitted to Environment and Climate Change Canada under the Chemicals Management Plan initiative, or as having restricted access. It is noted that the majority of these submissions are dated subsequent to the

final assessment of BNST. We question this significant use of confidential business information for a draft assessment that includes a substance that was initially scheduled for prohibition with restrictions. We also question that additional information did not include a range of toxic outcomes of importance such as endocrine disruption.

Straightforward data on levels of contaminants in Canada, and studies related to health and safety, should not be considered confidential business information.

7) The validity of confidential business information containing scientific data is of particular concern given known and suspected scientific improprieties described above. Independent assurances of good laboratory practices are obviously subject to abuse. There is a myriad of procedural ways to “lose” the analyte of interest. Beyond choice of solvent for extraction of highly lipophilic toxicants or reporting on a tissue rather without employing lipid normalization, another example is feeding a high fibre diet containing known absorbents of persistent organic pollutants, to reduce apparent bioavailability. There are many more.

   The government must consistently carry out scientific monitoring and auditing to ensure data accuracy and applicability. Possibilities include targeted experimentation in government laboratories, to verify and validate selected key findings. As well, government-supplied control and known samples should be analyzed in the same batches or at least under the same conditions by the same laboratory, to verify laboratory and methodological sensitivity, specificity and accuracy.

8) The data analysis in the draft risk assessment of the SDPAs, summarizes the uncertainty characterization and analysis of the weight of evidence in the assessment (Table 9-1). This is a useful addition to the assessment and is most relevant and essential – indeed central – to final conclusions. Fuller explanations would contribute to a more robust and transparent assessment, and potentially reduce bias.

   The methods, parameters and criteria used to determine the levels of confidence in the data set (high, medium, low) and the weight of evidence before coming to a conclusion, need to be better defined for transparency, clarity and precision.

9) It is clear from the draft assessment that SDPAs are persistent and are building up in the environment, which in itself is highly concerning.

   Future plans for continued environmental monitoring, assessment of endocrine disruption, and timelines, should be specified and justified for SDPAs. This should include the investigation and possible verification of questionable recent confidential data, and the investigation of a broad range of cellular signaling possibilities.

10) The current draft assessment highlights the magnitude of the issue of informed substitution when one high-volume, “popular” chemical is flagged as of concern.

Chemical assessments of a group of options for a given purpose, to identify least-toxic options based on pre-specified criteria, are greatly needed. Determinations of potential toxicity must be broad-based.

2) BNST - Risk management options

The Environment and Climate Change Canada (ECCC), 2016, new Proposed Approach to Regulatory Amendments to the Prohibition of Certain Toxic Substances Regulations, 2012, in consideration of the Draft Screening Assessment for Substituted Diphenylamine (SDPA) Substances offers two risk managements scenarios for BNST.[12]

- **Scenario 1**: In accordance with subsection 90(2) of the Canadian Environmental Protection Act 1999 (CEPA), should the Minister of the Environment and the Minister of Health conclude in the final screening assessment for SDPAs, anticipated in 2017, that **BNST is not toxic under section 64 of CEPA,** the Department of the Environment would consider changing the current regulatory proposal in order to publish final amendments **removing BNST from the Prohibition Regulations, 2012.**

- **Scenario 2:** Otherwise, should the Ministers conclude in the final screening assessment for SDPAs, anticipated in 2017, that **BNST remains harmful to the environment, or meets any other criteria of section 64 of CEPA**, the Ministers would recommend to finalize the proposed Amendments to **provide flexibility for the use of BNST beyond March 2018, in replacement parts and legacy equipment.**

We first offer the observation that given large data gaps and uncertain validity of industry-supplied data regarding bioaccumulation and biological effects, these proposals are arguably premature. As well, both scenarios lack essential details.

The following are our comments and recommendations on the two above risk management scenarios:

[12] Environment and Climate Change Canada (ECCC). 2016. Proposed Approach to Regulatory Amendments to the Prohibition of Certain Toxic Substances Regulations, 2012, in consideration of the Draft Screening Assessment for Substituted Diphenylamine (SDPA) Substances. http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=B524FBB5-1

Scenario 1:

In the risk-based assessment of the SDPAs, and specific to BNST, the significance of the persistence of BNST (meeting the criteria for P as stipulated in the Persistence and Bioaccumulation Regulations), remains very unclear. How this information would impact the possible removal of BNST from the Prohibition Regulations, 2012, is not articulated in this proposal.

Although not specified, it would be assumed that there would be no restrictions on any use of BNST but again, this is not included in Scenario 1.

Also, since some of these SDPAs are alternatives for each other, it may not be possible to determine which SDPAs are being used unless there is appropriate environmental monitoring.

Scenario 2:

The proposal for Scenario 2 lacks the necessary details as compared to those outlined in the proposed Regulations Amending the Prohibition of Certain Toxic Substances Regulations, 2012 for BNST. To provide more meaningful comments and recommendations, a greater level of detail from the government is essential.

A critical area not included in Scenario 2 is the permitted use of BNST for manufacture, use, sale, offer for sale and import of BNST when used as an additive in lubricants found in **new** parts since only replacement parts and legacy equipment were included. These options should be well-defined and leave very little room for doubt, even if they are in the draft stage.

Respectfully,

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