Appendix to Comments of Safer Chemicals Healthy Families on Risk Evaluation Problem Formulation Documents for Ten Chemical Substances under the Toxic Substances Control Act

For Carbon Tetrachloride, Docket ID No.: EPA-HQ-OPPT-2016-0733
Submitted via Regulations.gov (August 16, 2018)

This document supplements our general comments on the problem formulations for all 10 chemicals by providing specific details on Carbon Tetrachloride (CTC).

On March 15, 2017, Safer Chemicals Healthy Families, Environmental Health Strategy Center, and Healthy Building Network provided detailed comments on the scope of the risk evaluation for five of the 10 chemicals EPA designated for initial risk evaluations on December 19, 2016.[1] We summarized information on the chemicals' production and trade, uses, disposal, potentially vulnerable populations, exposure scenarios, and health and environmental hazards, as applicable. We urged the agency to ensure that the risk evaluation for each chemical would reflect the best information available on hazard and exposure, be based on a comprehensive understanding of the chemicals' conditions of use, and employ sound, precautionary methodologies that fully capture the risks they pose to human health and the environment.

The Problem Formulation of the Risk Evaluation for Carbon Tetrachloride (CTC Problem Formulation), issued by EPA on June 1, 2018,[2] has several critical deficiencies toward meeting those criteria.

I. USES

EPA must evaluate the complete life cycle of the chemical, but currently plans to disregard important sources of exposure to carbon tetrachloride (CTC).

A. EPA plans to ignore consumer products (and associated exposures)

EPA states that it will not evaluate consumer exposures to CTC. The agency explains as follows:

> "…carbon tetrachloride is used in the manufacturing of other chlorinated compounds that may be subsequently added to commercially available products (i.e., solvents for cleaning/degreasing, adhesives/sealants, and paints/coatings). Given the high volatility of carbon tetrachloride and the extent of reaction and efficacy of the separation/purification process for purifying final products, EPA expects insignificant or unmeasurable concentrations of carbon tetrachloride in the manufactured chlorinated substances in the commercially available products…. Because … consumer use of such products (solvents

[1] The March 2017 comments submitted on CTC were assigned the identifier of EPA-HQ-OPPT-2016-0733-0023, and are posted at https://www.regulations.gov/document?D=EPA-HQ-OPPT-2016-0733-0023.
[2] https://www.epa.gov/sites/production/files/2018-06/documents/ccl4_problem_formulation_05-31-18.pdf (CTC Problem Formulation)

> for cleaning/degreasing, adhesives/sealants, and paints/coatings) would present only de minimis exposure or otherwise insignificant risk, EPA has determined that these conditions of use do not warrant evaluation, and EPA does not expect to consider or evaluate these conditions of use or associated hazards or exposures in the risk evaluation for carbon tetrachloride. Based on information obtained by EPA and the household products ban at 16 CFR 1500.17(a)(2), there are no other approved consumer uses for carbon tetrachloride. **Therefore, as a general matter, EPA does not expect to analyze consumer exposures or associated hazards in the risk evaluation for carbon tetrachloride**…"[3] (emphasis added)

Later, EPA adds:

"Trace levels of carbon tetrachloride in the chlorinated substances used to manufacture the products are expected to volatilize during the product manufacturing process."[4]

According to the Safety Data Sheets of products listed in the Consumer Appendix of our March 2017 comments, the concentrations of CTC in products available for use by consumers can be up to 1% by weight. As listed in EPA's February 2017 Preliminary Information document, concentrations of CTC in paint and adhesive products are up to 2.5% by weight.[5] These are not negligible amounts, and unless EPA can prove these are incorrect, the potential exposures from these products should still be evaluated. The Technical Appendix of our comments also discusses CTC in an epoxy resin used as a primer to coat plastic parts.[6] EPA should account for this use and investigate it further.

B. EPA is apparently ignoring other sources of CTC

EPA leaves out many other sources of CTC that we mentioned in our comments and that may be significant, including:

- Chemical manufacturing plants using CTC as a feedstock to produce hydrochloric acid, 1,1,1,3,3-Pentachlorobutane, Aluminum trichloride, Polyfunctional aziridines, methyldichlorophosphane, triamcinolone benetonide, and polyols[7]
- Chemical plants manufacturing chlorinated pyridine or chlorinated methanes and generating CTC as a co-product[8]

It is unclear whether certain additional sources will be included in the risk evaluation, such as plants using CTC to manufacture vinyl chloride monomers.[9]

C. EPA should carefully examine recent reports on CTC release variation amongst chlorine utilizing facilities

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[3] CTC Problem Formulation, p 20-1
[4] CTC Problem Formulation, p 37
[5] Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal for Carbon Tetrachloride, February 2017, p 9-10, https://www.epa.gov/sites/production/files/2017-02/documents/carbon_tetrachloride.pdf
[6] EPA-HQ-OPPT-2016-0733-0023, Technical Appendix, p 13, 18
[7] EPA-HQ-OPPT-2016-0733-0023, Summary Comment, p 7
[8] Id.
[9] This is mentioned in Appendix C (p 83) but not in Table 2-3

A recent report from the Healthy Building Network, entitled "Chlorine and Building Materials: A Global Inventory of Production Technologies, Markets, and Pollution[10]" examines the global supply chain for building products that include chlorinated components, and documented patterns of CTC release, amongst other pollutants. As EPA considers the exposures to workers, surrounding communities, and to environmental media, it is important that the agency consider the highest levels found, as well as the trend for increasing levels of CTC release documented at many facilities. In particular, the Healthy Building Network noted in their report[11]:

- Releases of chlorine and chlorinated compounds (including carbon tetrachloride, dioxin, EDC, hydrochloric acid, and VCM) vary significantly among facilities. However, we also found distinct trends within release data.
- Release rates of chlorinated pollutants, overall, do not appear to correlate with any particular technology used to produce the chlorine in these plants.
- Most chlorinated pollution is associated with the production of EDC, VCM, and PVC resins, not chlorine alone.
- The highest rates in the US come from plants that produce VCM. Most of the highest emission plants are owned by Westlake. The Calvert City, Kentucky, plant owned by Westlake reported the highest rates of EDC and VCM releases. The Formosa plant in Point Comfort, Texas, released carbon tetrachloride and chloroform at rates (per chlorine throughput capacity) higher than any other place in the US.
- Five of the 10 leading point sources of carbon tetrachloride pollution in the US were chemical complexes with chlor-alkali plants.
- Some plants' releases of carbon tetrachloride are increasing because they are using it as a feed-stock for a new generation of blowing agents.
- Releases of carbon tetrachloride worldwide are much higher than industry experts predicted in the 1990s, when a global treaty regulating ozone depleting substances exempted the use of this chemical as a feedstock.
- No European chlorine plant has reported carbon tetrachloride releases; however, scientists predict that these plants may be releasing as much as 0.4 kg of this chemical per ton of chlorine produced.
- Using this rate of 0.4 kg-per-ton of chlorine produced, plants in Europe (11,069,000 tons of estimated chlorine capacity), the Americas (16,634,000 tons), and Africa (728,000 tons) have the capacity to release over 11,000 tons of carbon tetrachloride

Additional original research on CTC appears on pages 43-46 of the Healthy Building Network report, and specifics on plant-level use and production appear in other sections of the report.

II. EXPOSURES

A. EPA completely disregards exposures to the general population, including aggregate exposure

[10] Available at https://healthybuilding.net/reports/18-chlorine-building-materials-project
[11] "Chlorine and Building Materials," p 12

EPA indicates that it intends to disregard in its risk evaluation all aspects of the general population's exposure to CTC, even after the agency lists specific exposures. This includes the exposure pathways of (1) ambient air from CTC emissions from commercial and industrial stationary sources, (2) drinking water in public water systems, (3) ambient surface water, (4), biosolids, and (5) disposal releases, whether from incineration, underground injection, or hazardous waste landfills.[12] EPA argues that other regulatory programs administered by EPA "adequately assess and effectively manage the risks of carbon tetrachloride that may be present in various media pathways (e.g., air, water, land) from TSCA conditions of use and subsequent partitioning and transport processes (i.e., vapor intrusion) for the general population."[13]

However, this approach fails to account for aggregate exposure, as we called on EPA to assess in our March 2017 comments.[14] Evaluating exposures to media such as air and water only within individual regulatory programs, and separately from exposures faced by individual subpopulations such as workers, does not allow for the likelihood that people are exposed to CTC in more than one medium or setting, and will underestimate the total risk. The agency may end up finding that inhalation exposures of workers, for example, are acceptable without accounting for exposures from ambient air in the neighborhood where the worker lives and thus underestimating the total exposure level.

Further, as part of its rationale for disregarding exposures to consumers and as quoted above, EPA states that CTC in the chlorinated compounds used to make consumer products will volatilize in manufacturing. Even if this is the case, those CTC emissions do not only put workers and occupational non-users at risk but communities living near the manufacturing facilities as well. EPA states that it expects to evaluate inhalation exposures faced by workers and occupational non-users, but says nothing about assessing the corresponding risk for nearby communities. EPA must account for this exposure.

B. EPA has not confirmed it will capture exposures to *all* potentially exposed or susceptible subpopulations (PESS)

EPA names workers and occupational non-users as potentially exposed or susceptible subpopulations (PESS), although the agency leaves open the possibility of considering additional PESS "based on greater exposure." EPA states it may base this determination on unique characteristics such as "activities, duration, or location of exposure."[15] As stated in our March 2017 comments, we urge EPA to fully assess exposures to fenceline communities and determine whether any communities of color or low-income communities are disproportionately exposed and thus a PESS.[16] We recommend making this determination using Census Bureau data, geocoded locations of industrial facilities and disposal sites, and modeled or measured exposures.

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[12] CTC Problem Formulation, p 48-50
[13] CTC Problem Formulation, p 48-51 and 56
[14] EPA-HQ-OPPT-2016-0733-0023, Summary Comment, p 3 & 8
[15] CTC Problem Formulation, p 38-9
[16] EPA-HQ-OPPT-2016-0733-0023, Summary Comment, p 8

We also call on EPA to reach a conclusion specifically on whether any of the CTC production, use, or disposal activities result in disproportionate exposure to women of reproductive age, pregnant women and their fetus, infants, children, and the elderly.

As with the general population, we again urge EPA to assess aggregate exposures for *all* PESS. Accounting only for the exposures workers face on the job but not at their homes renders this task impossible.

C. EPA should assess cumulative exposure and risk for CTC in combination with other risk factors

The CTC Problem Formulation has no reference to cumulative exposure. EPA must include this in its risk evaluation.

III. HEALTH AND ENVIRONMENTAL IMPACTS

A. EPA disregards key health hazards posed by CTC

EPA notes that a number of animal studies found through the agency's initial data screening process were intended "to induce a disease state in an animal (e.g., cirrhosis, fibrosis, organ damage: liver, kidney, testes and others… and/or (2) Exposure was via injection."[17] The fact that these studies exist provides clear evidence that CTC is toxic. EPA does describe concerns about liver and kidney toxicity in the section on human health hazards (2.4.2), but we want to ensure EPA gives these health concerns and others their full weight in the risk evaluation.

The CTC Problem Formulation makes no mention of assessing CTC's effects on the endocrine system or its effects on the eyes as an irritant. The research institute TEDX and Japanese government agencies have highlighted the risks in this area, as shown in our March 2017 comments.[18]

B. EPA ignores CTC's risks - to both human health and the environment - resulting from its global warming potential and ozone depleting potential

CTC has an ozone depleting potential (ODP) of 0.82, which is roughly the same as several chlorofluorocarbons.[19] An intact ozone layer is critical for protecting the public from UV rays linked to skin cancer and cataracts. The chemical also has a significant global warming potential (GWP), and it is 1,730 times more potent than CO_2.[20] Global warming is one of the most critical public health and environmental issues of our time, with the increased intensity of storms and temperature extremes, among other effects, putting people's lives at risk. With CTC production projected to significantly increase, the chemical's contribution to ozone depletion and global warming will likely increase. The EPA should assess how CTC's ODP and GWP harm health and the environment.

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[17] CTC Problem Formulation, p 17
[18] EPA-HQ-OPPT-2016-0733-0023, Technical Appendix, p 25
[19] EPA-HQ-OPPT-2016-0733-0023, Summary Comment, p 4
[20] Id.

IV. DATA GAPS

A. EPA should require industry to fill data gaps

In its Analysis Plan, EPA states that the agency will "attempt to address data gaps" by reviewing "reasonably available exposure data for surrogate chemicals that have uses and chemical and physical properties similar to carbon tetrachloride." Additionally, "For conditions of use where data are limited or not available, [the agency will] review existing exposure models that may be applicable in estimating exposure levels."[21] Instead of relying on these measures, EPA should ask industry to produce the data that is necessary to complete the risk evaluation.

[21] CTC Problem Formulation, p 54-55