

September 8, 2023

Submitted electronically via the eRulemaking Portal: <https://www.regulations.gov/commenton/EPA-HQ-OPPT-2016-0723-0095> and <https://www.regulations.gov/docket/EPA-HQ-OPPT-2022-0905>

Michal Freedhoff, PhD.  
Assistant Administrator  
Office of Chemical Safety and Pollution Prevention  
US Environmental Protection Agency  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

**Re: 1,4-Dioxane; Draft Supplement to the TSCA Risk Evaluation; Science Advisory Committee on Chemicals (SACC) Meeting; Notice of Meeting and Request for Comment, Docket No. EPA-HQ-OPPT-2022-0905, 88 Fed. Reg. 43562 (July 10, 2023).**

and

**1,4-Dioxane; Draft Revision to Toxic Substances Control Act (TSCA) Risk Determination; Notice of Availability and Request for Comment, Docket No. EPA-HQ-OPPT-2016-0723, 88 Fed. Reg. 48249 (July 26, 2023).**

Dear Dr. Freedhoff,

The Energy Workforce & Technology Council respectfully submits comments regarding the draft supplement to the 1,4-dioxane risk evaluation<sup>1</sup> and the draft revised risk determination for 1,4-dioxane.<sup>2</sup>

The Energy Workforce & Technology Council is the national trade association for the energy services and technology sector representing over 250 member companies and 660,000 workers in the United States. Like the rest of the energy sector, the companies that comprise our membership are diverse in size, scope, and governance models. Our members represent the spectrum from private sole proprietorships to publicly held companies with thousands of employees. Dear Sir or Madam:

These comments urge EPA not to finalize the 1,4-dioxane risk evaluation and related risk determination until EPA can obtain industry-specific data on which to base its evaluation and determination pertaining to the hydraulic fracturing condition of use. The comments also point out critical flaws in EPA's modeling of exposures to 1,4-dioxane for that condition of use.

---

<sup>1</sup> Draft Supplement to the Risk Evaluation for 1,4-Dioxane CASRN 123-91-1 (July 2023) (draft supplement to the risk evaluation), <https://www.epa.gov/system/files/documents/2023-07/1.%20Draft%20Supplement%20to%20the%20Risk%20Evaluation%20for%2014-Dioxane%20-%20public%20release%20-%20hero%20-%20July%202023.pdf>.

<sup>2</sup> 1,4-Dioxane Draft Revised Unreasonable Risk Determination (July 2023) (draft revised risk determination), <https://www.epa.gov/system/files/documents/2023-07/Draft%20Revised%20Risk%20Determination%2014-Dioxane-2023.pdf>.

**Comment 1:**

**Until Recently, EPA Provided Insufficient Notice That Hydraulic Fracturing Was Considered a Condition of Use, Resulting in an Inadequate Factual Basis for Its Risk Evaluation and Risk Determination**

Hydraulic fracturing was not mentioned in the 2017 scope document for 1,4-dioxane.<sup>3</sup> Neither was it mentioned in the 2020 final risk evaluation for 1,4-dioxane.<sup>4</sup> It was not mentioned in the 2021 EPA press release announcing a new approach for the risk evaluation for 1,4-dioxane and other chemicals.<sup>5</sup> It was not mentioned publicly during the next two years while EPA worked on its draft supplement to the final risk evaluation. The first notice that EWTC received that EPA was considering hydraulic fracturing in the context of the 1,4-dioxane risk evaluation was on July 10, 2023. The Federal Register notice published that day announced that “EPA Assessed Hydraulic fracturing as a Condition of Use.”

EWTC would have commented earlier on the ongoing 1,4-dioxane risk evaluation if it had had notice that EPA was evaluating hydraulic fracturing as a condition of use. It did not.

EWTC’s review of the dockets identified no industry submissions explaining how 1,4-dioxane comes to be present in hydraulic fracturing; the concentrations of 1,4-dioxane in hydraulic fracturing fluid; the exposure controls in place to prevent or limit employee exposure to 1,4-dioxane; or the levels of exposure to 1,4-dioxane resulting from this condition of use. Indeed, the draft supplement to the risk evaluation provides no exposure monitoring data or even much explanation of this condition of use. Its exposure estimates are entirely based on modeling. Nevertheless, based on the findings of the draft supplement to the risk evaluation, the draft revised risk determination would find that the hydraulic fracturing condition of use contributes to the determination that 1,4-dioxane presents an unreasonable risk.

Under TSCA section 26(k), EPA must base its risk evaluation for 1,4-dioxane on “reasonably available information,” including “exposure information, under the conditions of use, that is reasonably available to the Administrator.” Here, EPA could have and would have obtained use and exposure information for the hydraulic fracturing condition of use if only it had provided notice that hydraulic fracturing was considered a condition of use. Because it did not, the draft supplement to the risk evaluation is not based on “reasonably available information” as required by section 26(k).

---

<sup>3</sup> Scope of the Risk Evaluation for 1,4-Dioxane CASRN: 123-91-1 (June 2017), [https://www.epa.gov/sites/default/files/2017-06/documents/dioxane\\_scope\\_06-22-2017.pdf](https://www.epa.gov/sites/default/files/2017-06/documents/dioxane_scope_06-22-2017.pdf).

<sup>4</sup> Final Risk Evaluation for 1,4-Dioxane CASRN: 123-91-1 (Dec. 2020) (2020 risk evaluation), [https://www.epa.gov/sites/default/files/2020-12/documents/1\\_risk\\_evaluation\\_for\\_14-dioxane\\_casrn\\_123-91-1.pdf](https://www.epa.gov/sites/default/files/2020-12/documents/1_risk_evaluation_for_14-dioxane_casrn_123-91-1.pdf).

<sup>5</sup> “EPA Announces Path Forward for TSCA Chemical Risk Evaluations (June 20, 2021), <https://www.epa.gov/newsreleases/epa-announces-path-forward-tasca-chemical-risk-evaluations>. That announcement merely said: “EPA currently intends to re-open and update the 1,4-dioxane risk evaluation to consider whether to include additional exposure pathways, like drinking water and ambient air, and conditions of use where 1,4-dioxane is generated as a byproduct that were excluded from the supplemental and final risk evaluations.” This ambiguous statement did not provide adequate notice that hydraulic fracturing would be designated as a condition of use.

**Recommendation:**

Accordingly, EPA should not finalize the supplement to the risk evaluation and the risk determination until it provides a meaningful opportunity (not just a single 60-day notice period) for stakeholders to gather and, in some cases, develop information that EPA should consider before making its final risk determination.

EWTC intends to provide such information in supplemental comments.

**Comment 2.****The Draft Risk Evaluation Appears to Greatly Overstate Potential Exposure to 1,4-Dioxane in the Hydraulic Fracturing Condition of Use**

Clearly explaining one's methods in a manner that would allow others to critically evaluate and reproduce the results of an analysis is a cornerstone of science. It is part of the requirement to rely on the best available science, as required of EPA for risk evaluations under TSCA section 26(h).<sup>6</sup> Yet, in the draft supplement to the risk evaluation, EPA has not provided sufficient information to explain its methodology or to allow others to critically evaluate its model inputs and assumptions with respect to the hydraulic fracturing condition of use. Therefore, EPA has not met one of the basic tenets of science in its risk evaluation or met its obligations under section 26(h). The following examples illustrate *some* of the key shortcomings.

**Example A.**

The draft supplement to the risk evaluation (page 410 of 484) explains:

EPA estimated occupational exposure for most COUs based on available monitoring data. For COUs without occupational monitoring data, EPA applied Monte Carlo methods to estimate exposures using generic scenarios and emission scenario documents.<sup>7</sup>

For hydraulic fracturing, EPA has not provided any monitoring data. Yet the "generic scenarios and emission scenario documents" on which it based its modeling for the hydraulic fracturing condition of use are not publicly available.<sup>8</sup> Since the emission scenario document that forms the basis of its approach is not publicly available, EPA has not provided the necessary information on its methodology and assumptions regarding hydraulic fracturing releases and exposures, nor the bases for the same. This is a fundamental shortcoming of EPA's risk evaluation, since it prevents the public's ability to review and therefore comment on EPA's underlying approach and assumptions (e.g., appropriateness, validity).

---

<sup>6</sup> Among other things, the section 26(h) "best available science" requirement includes consideration of "the degree of clarity and completeness with which the data, assumptions, methods, quality assurance, and analyses employed to generate the information are documented."

<sup>7</sup> Draft supplement to the 1,4-dioxane risk evaluation at 20-21.

<sup>8</sup> The draft supplement to the risk evaluation states at 346 and 425 that its "approach utilizes the Draft ESD on Chemicals Used in Hydraulic fracturing (U.S. EPA, 2022d) combined with Monte Carlo simulation (a type of stochastic simulation)." The cited reference, U.S. EPA, 2022d, in turn cites "Emission scenario document on chemicals used in hydraulic fracturing (draft). In OECD Environmental Health and Safety Publications, Series on Emission Scenario Documents. Paris, France: Organization for Economic Co-operation and Development. This document has only become available within the last 5 days before the required submittal date.

In addition, EPA has not defined important terminology used in the draft supplement to the risk evaluation and has not explained its methodology for selecting hydraulic fracturing “facilities” included in its analysis.

- EPA has not defined what it means by the term “facilities” with respect to hydraulic fracturing. Is a facility a well pad, a well, a hydraulic fracturing stimulation at a certain well, or something else? This term needs to be clearly defined so that reviewers can evaluate whether the exposure scenarios assumed by EPA for workers at a hydraulic fracturing “facility” are consistent with the activities that such workers actually undertake.
- EPA has not identified the timeframe over which it determined that there were 411 hydraulic fracturing “facilities” at which 1,4-dioxane was present or any other details of a methodology that it used to identify 411 “facilities” from the FracFocus database. This information is not contained within EPA’s risk evaluation report, nor in the accompanying appendices and supplements to the report. EPA should explain its methodology in a sufficiently detailed manner for others to reproduce its approach and identify the 411 hydraulic fracturing “facilities” that it relied upon.

Assuming that, for the hydraulic fracturing condition of use, EPA intended to define a “facility” as a hydraulic fracturing stimulation at a certain well, it appears the EPA incorrectly assumed that a hydraulic fracturing worker would be exposed to 1,4-dioxane each and every year. Each year, only a small fraction of stimulations have 1,4-dioxane present in hydraulic fracturing fluid. Thus, as a hydraulic fracturing worker moves from one well to another throughout the year (or from year to year), there is only a small likelihood that the worker would be at a job site where 1,4-dioxane is present. From 2012 to 2023,<sup>9</sup> the percentage of wells in FracFocus that reported the presence of 1,4-dioxane ranged from 0.17% to 4.5% in any given year, and the average across all years (2012-2023) was 2%. Thus, based on that information, on average, a hydraulic fracturing worker has an approximately 2% likelihood of working at a site where 1,4-dioxane is present.

**Recommendation:**

EPA needs to factor this likelihood of exposure into its analysis.

If EPA had incorporated the average likelihood that exposure would occur (i.e., 2% – a value that should be incorporated into Equation G-3 of the 2020 risk evaluation<sup>10</sup> for calculating the exposure frequency, EF) in its risk calculations, the resulting chronic risk estimates would change by a factor of 50 (i.e., lower risk). Incorporating this factor of 50 would alone result in the chronic (cancer or non-cancer) dermal (gloved) and inhalation scenarios for hydraulic fracturing being below EPA’s stated risk benchmarks.

**Example B.**

EPA mischaracterized the activities and exposure conditions for a hydraulic fracturing worker (container unloading, container cleaning, and equipment cleaning) that have led to overstated exposures and risks.

The worker activities that EPA assumed for hydraulic fracturing are inconsistent with actual worker activities. EPA assumed that a worker undertakes the following three activities during an 8-hour shift:

---

<sup>9</sup> This period was from January 1, 2012 to August 7, 2023. Prior to 2012, there was no reported presence of 1,4-dioxane in hydraulic fracturing fluid ingredients that were uploaded to FracFocus.

<sup>10</sup> 2020 risk evaluation at page 385.

container unloading, container cleaning, and tank/equipment cleaning. However, the manner in which EPA assumed that workers unload containers was incorrect. Container unloading occurs with little or no direct contact between products and air (or a worker's skin). Neither container cleaning nor tank/equipment cleaning is an activity actually undertaken by hydraulic fracturing workers. These mischaracterizations of worker activities have caused EPA to overestimate substantially the exposure levels of hydraulic fracturing workers. Each of these issues is discussed further below.

EPA assumed that hydraulic fracturing workers pour hydraulic fracturing products from containers with 2" diameter openings into other containers for up to 2 hours per day (i.e., EPA's container unloading scenario - page 426 of 484). However, this activity does not occur. Liquid products at a hydraulic fracturing operation are transferred from totes or tanks to the blender (unit that mixes water and products into hydraulic fracturing fluid) using temporary hose connections. Pumps that are connected to the hoses transport the products, and therefore no containers are left open for the extended periods of time assumed by EPA (i.e., up to 2 hours). The hose connections that workers make to totes/tanks occur without any liquid being exposed to the open air. Thus, the release scenario envisioned by EPA mischaracterizes the actual container unloading practices at a hydraulic fracturing job site. In actuality, by design, there should not be any open containers that would expose products directly to air, and all product transfers occur through hoses with little or no contact between products and a worker's skin or breathing-zone air.

EPA also assumed that hydraulic fracturing workers clean the containers that they unloaded for up to 2 hours per day. However, this activity does not occur. Hydraulic fracturing workers do not clean containers at well pads. After a hydraulic fracturing stimulation is complete, containers are transported from the site either to be refilled and dispatched to the next location or if in one-way containers, they are sent to an off-site permitted recycling facility.

For the remainder of the workday (4 hours per day – page 355 of 484), EPA assumed that hydraulic fracturing workers clean large tanks ("equipment") with approximately 3-foot (92 cm) diameter openings. However, this activity does not occur. Hydraulic fracturing workers do not clean tanks or other equipment at well pads. After a hydraulic fracturing stimulation is complete and while the hydraulic piping connections are still in place, tanks and equipment are flushed and then disconnected before transported from the site to either the next location or to the company's home facility.

Workers on hydraulic fracturing locations who are doing the hose connections/disconnections are wearing chemically resistant gloves, in addition to other appropriate Personal Protective Equipment (PPE) as identified on the Safety Data Sheet (SDS) such as face shields and aprons.

**Recommendation:**

EPA has risk results for dermal exposure scenarios with and without gloves. Since gloves are worn during chemical handling activities, EPA should reduce the calculated risks by a factor of 20.

In summary, the exposure assumptions for the hydraulic fracturing condition of use in the draft supplement to the risk evaluation are simply incorrect, making the modeled exposures highly inaccurate. EPA should not rely on them for its risk evaluation and subsequent risk determination. Instead, EPA should accept actual data on the hydraulic fracturing condition of use and then complete its risk evaluation based at least in part on that information. EWTC plans to submit such information in the near future.

Sincerely,



Tim Tarpley  
President  
Energy Workforce & Technology Council