

February 22, 2021

The Honorable Jane Nashida  
Acting Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
7101 M  
Washington, DC 20460

Dear Acting Administrator Nashida:

**RE: Interim Guidance on PFAS Disposal and Destruction (EPA-HQ-OLEM-2020-0527 FRL-10017-07-OLEM)**

We the undersigned coalition of trade associations and companies appreciate the opportunity to provide comments regarding your proposed Interim Guidance on per- and polyfluoroalkyl substances (PFAS) Disposal and Destruction. Our coalition and member companies represent manufacturers and users of PFAS from a variety of sectors including aerospace, automobiles, construction, electronics, traditional and alternative energy, and textiles to medical devices, national security, and public safety.

The coalition urges EPA to continue to promote flexibility in recommending methods that ensure the safe disposal and destruction of PFAS. The guidance should reflect not only a variation of available disposal and destruction options, but what options are the most effective, as outlined by data and research.

While there is a prioritization of methods, the lack of performance data referenced in the interim guidance does not correlate to the prioritization approach or concrete actions to implement the disposal and destruction methods EPA selected. This very prescriptive prioritization of lower uncertainty to higher uncertainty without a basis for the ranking, implies one technology is better than another for all circumstances. For instance, the interim storage option is listed as the least uncertain. However, storing PFAS material from up to 2 to 5 years, without additional guidance on how to do it (e.g., in containment, lining the storage location, distance from water bodies) — on top of significant management and cost burdens — does not offer sufficient information to confirm interim storage as the most protective of the environment.

Anecdotally, an unregulated labeled container does not seem more protective of the environment on a short to medium term basis as compared to a RCRA-permitted hazardous waste landfill or solid waste landfill with strict, regulated impermeable liners. In addition, incineration is listed as the most uncertain disposal option. Per EPA research and other independent studies referenced in our Appendix, incineration can be a safe and efficient mode of PFAS destruction through properly designed, operated, and permitted incinerators. There should be more thorough and transparent explanation of the basis for ranking disposal and destruction methods.

The guidance should also propose additional testing, where deemed necessary, to better reflect the variation in disposal methods and destruction operating parameters, and waste types. We appreciate

the opportunity to offer detailed feedback on specific language in the interim guidance in the appendix below.

EPA's failure to offer clear and concise guidance on the proper disposal of PFAS wastes is leading to a patchwork of inconsistent state standards. If a determination cannot yet be made due to a lack of data, that also needs to be clear and concise. We look forward to working with you to finalize this Interim Guidance to address local concerns and to ensure a consistent approach to treatment and risk communications.

We stand ready to answer any questions you may have.

Sincerely,

American Chemistry Council

American Fuel and Petrochemical Manufacturers

American Petroleum Institute

National Association of Chemical Distributors

U.S. Chamber of Commerce

**Interim Guidance on PFAS Disposal and Destruction**  
**Detailed Comments**  
**U.S. Chamber of Commerce**  
February 22, 2021

**Appendix 1**

**Landfilling, deep-well injection, and solidification/encapsulation should continue to be viable options for disposal under appropriate circumstances**—These methods have been demonstrated as effective solutions for managing a wide waste-types under contemporary regulations.

- Although the agency (pg. 55 3.b Landfills). acknowledges that landfills are designed to control specific chemicals (e.g. dioxins and other hazardous wastes), it oversteps by concluding landfills are not equipped to contain PFAS waste. No data or information is offered that PFAS could not be controlled along with dioxin and other hazardous substances.

**Per EPA and other independent studies, incineration can be a safe and efficient mode of PFAS destruction and should not be listed as the method of most uncertainty**—PFAS compounds and PFAS containing materials can be safely and efficiently destroyed through properly designed and operated incineration, among other approaches, including the following important attributes:

- Existing requirements for temperature, flow rate, and residence time at permitted facilities provide for responsible treatment of PFAS wastes. For decades, incinerator operators have optimized these operating parameters successfully to achieve high destruction levels of a wide range of compounds while complying with EPA’s Clean Air Act requirements under the NESHAP and NSPS programs for incinerators and waste combustors. (Citation – 40 CFR 63.1219(c) which specified removal efficiency requirements, per the Coalition for Responsible Waste Incineration (CRWI) letter).
- If the incinerator is operating in compliance with all operating permit provisions, incineration should continue to be an option for the proper destruction of the PFAS compound. Current standards allow safe destruction of persistent bio-accumulative substances at very low levels, although various destruction processes may not result in non-detect levels, and destruction efficiencies upwards of 99.99% for a principal organic hazardous constituent.
- Incinerators have been shown to be effective with a range of compounds by operating at high temperatures. However, temperature alone should not be the limiting factor. CRWI reports that effective destruction and removal efficiency may be achieved with a range of temperatures if other adequate process variables, such as residence time, are achieved. There are peer-reviewed papers on destruction of PFAS containing materials via incineration.
  - A 2003 study from the University of Dayton found that 99.95% of PFOS at 1,650 degrees F with a two-second residence time for destruction<sup>2</sup>
  - A 2005 study from the University of Dayton<sup>3</sup> found PFOA was not released, and—
    - 99.9% of fluorotelemer-based acrylic PFAS polymers destroyed at 1,800 degrees F with a two- second residence time .<sup>3</sup>

- 99.9% for paper and fabric coated with polymers at 1,380 degrees F with a two-second residence time.<sup>4</sup>
- Appropriate and permitted incineration sites should be permitted to receive and destroy halogenated compounds (e.g., fluorine containing compounds, such as PFAS).
- The site should be equipped and operated with air pollution control equipment necessary for treatment/destruction of acid gas derived from the incineration of halogens.
- While no PFAS compounds are identified as principal organic hazardous compounds<sup>5</sup>, recent research has suggested that longer chain PFAS compounds will fall in the lower classes that are easier to destroy (EPA-HQ-OPPT-2003-0012-0051).
- EPA guidance should include commercial and industrial solid waste thermal combustion devices, such as kilns and municipal solid waste incinerators that are designed and permitted to destroy PFAS-type compounds under clear performance standards and specifically mention or be updated to include PFAS.

### **Specific Language Comments**

- Table 2-2 List of sources of AFFF users. We suggest adding general manufacturing facilities as a source of AFFF. There are many various types of manufacturing industries that use a Class B firefighting foam for protection against flammable liquid fires. Alternatively, the “Oil refineries and processing facilities” can be updated to reflect the definition presented in Darwin (2011) to represent “Oil refineries and other Petro-chem” facilities, which includes oil refineries, petroleum blending and storage facilities and miscellaneous chemical companies. Note, Darwin (2011) indicates a reduction in AFFF use over time.
- Remove Table 2-3. At present, there is not a lot of information on PFAS in biosolids providing values without a good representation of the value or meaning could be counterproductive to more well-developed biosolids research currently in USEPA development, reportedly nearing management review completion and release.
- Section 3. Technologies for the Destruction and Disposal of PFAS and PFAS – Containing Materials. The majority of text in this section does not include references to the data provided. Please include the appropriate references where applicable.
- Table 3-3. The Coalition recommends adding another column in the table with the cost per ton of waste so that it is easily compared to the other disposal costs that are included in a \$/ton unit.
- *Pg. 55-* “Because landfills are a containment method and do not destroy PFAS, PFAS are expected to persist in landfills for the life of the compounds, which could be many years or until they are released.” Peter Jaffe’s 2019 publication<sup>1</sup> has shown anaerobic biodegradation of PFAS suggesting PFAS destruction in landfills may be occurring making this statement inaccurate.

- *Table 3.6 Pg. 63:*
  - a) Update correct statements such as, that Ion Exchange Resin is “less effective for short-chain PFAS” *which contradicts the ITRC PFAS Fact Sheet: “IX resins have been shown to have high capacity for many shorter-chain PFAS (Woodard et. al. 2017).<sup>6</sup>”*
  - b) Although table lists some developing technologies such as ozofractionation; it excludes others such as electrochemical oxidation, and other aggressive redox processes (e.g. activated persulfate, zero valent metals, and UV + sulfite) that also show promise.
  - c) Biological process listed excludes anaerobic PFAS biodegradation (defluorination by *Acidimicrobium* sp Strain A6) as reported in 2019 by Peter Jaffe from Princeton<sup>1</sup>.
  - d) Lastly Huff et al., (2020)<sup>7</sup> has demonstrated the viability of phytoextraction as a means of treatment of PFAS contamination as reported in the 2019 EPA “Final Report: Phytoremediation of perfluoroalkyl substances (PFAS) via phytoextraction.”

- Pg. 65 3.b.iii.3 Leachate management and treatment technologies

The second sentence in the following paragraph makes a statement that suggests there would be more volatile PFAS air emissions if stripping the leachate. The term “more volatile” is confusing: rather than “more” (in number or volume) volatile, the term “more” could be dropped given only volatiles would be hypothetically emitted. The basis for this assertion is unknown and perhaps unintended.

- *Pg. 65:*  
*“Ion exchange can be flexibly designed to address different compounds and may be effective at reducing PFAS in leachate; however, performance data are not currently available” – this statement is incorrect as this is a field demonstrated technology per the ITRC 2020 PFAS Guidance Document with several full scale systems operating in Australia and the US<sup>8</sup>.*

***“Natural processes (such as constructed wetlands and phytoremediation) and biological processes (degradation, nitrification, and denitrification) are expected to be ineffective at treating and preventing release of many PFAS into the environment. Current biological treatment processes such as the activated sludge process and sequencing batch reactor have not been shown to be effective at treating many PFAS, but future research may show biological treatment can play a role in controlling some PFAS or converting them into other types of PFAS.” - this statement is inaccurate for reasons c&d as listed above in reference to Table 3.6***

- *Pg. 71:*

*“Leachate treatment through natural processes such as constructed wetlands, land application, or ponds is ineffective for preventing the release of PFAS into the environment.” – this statement is inaccurate for reason d as listed above regarding phytoextraction in Table 3.6.*

## References:

- <sup>1</sup> Huang, Shan, Peter R. Jaffe, "Defluorination of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) by Acidimicrobium sp. Strain A6" *Environmental Science and Technology* (2019 53(19), 11410-11419, DOI:10.1021/acs.est9b04047).
- <sup>2</sup> University of Dayton Research Institute, Environmental Science and Engineering Group Yamada, T. and Taylor, P. 2003, Thermal Degradation of Perfluoro-Octanyl Sulfonate and Related Substances, ((EPA-HQ-OPPT-2003-0012-0151).
- <sup>3</sup> University of Dayton, Yamada, T., P. Taylor, R. Buck, M. Kaiser, and R. Giraud. 2005. Thermal degradation of fluorotelomer treated articles and related materials. (*Chemosphere*. 61:974-984), 2005.
- <sup>4</sup> Taylor, P. H.; Yamada, T.; Striebich, R. C.; Graham, J. L.; and Giraud, R. J., "Investigation of waste incineration of fluorotelomer-based polymers as a potential source of PFOA in the environment" *Chemosphere* 2014, v110, p17-22.
- <sup>5</sup> "Guidance on Setting Permit Conditions and Reporting Trial Burn Results. Volume II of the Hazardous Waste Incineration Guidance Series," January 1989, (EPA/625/6-89/019).
- <sup>6</sup> Woodard, Steve, John Berry, and Brandon Newman. 2017. "Ion exchange resin for PFAS removal and pilot test comparison to GAC." *Remediation Journal* 27 (3):19-27. DOI: 10.1002/rem.21515.
- <sup>7</sup> David K. Huff, Lawrence A. Morris, Lori Sutter, Jed Costanza & Kurt D. Pennell (2020) Accumulation of six PFAS compounds by woody and herbaceous plants: potential for phytoextraction, *International Journal of Phytoremediation*, 22:14, 1538-1550, DOI: [10.1080/15226514.2020.1786004](https://doi.org/10.1080/15226514.2020.1786004).
- <sup>8</sup> ITRC September 2020 PFAS Guidance Document, Section 12.2.

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