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INDIVIDUAL MEMBERS

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Ronald O. Kagel, PhD

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University of California – Berkeley
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University of Kentucky
University of Maryland
University of Utah

44121 Harry Byrd Highway, Suite 225
Ashburn, VA 20147

Phone: 703-431-7343
E-mail: mel@crwi.org
Web Page: <http://www.crwi.org>

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Washington, DC 20460

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The Coalition for Responsible Waste Incineration (CRWI) appreciates the opportunity to submit comments on the *Interim PFAS Destruction and Disposal Guidance*; Notice of Availability for Public Comment. 85 FR 83,554 (December 22, 2020). CRWI is a trade association comprised of 27 members representing companies that own and operate hazardous waste combustors and companies that provide equipment and services to the combustion industry.

Attached are comments on the proposed requirements.

Thank you for the opportunity to comment. If you have any questions, please contact me at (703-431-7343 or mel@crwi.org).

Sincerely yours,

Melvin E. Keener, Ph.D.
Executive Director

cc: CRWI members
C. Pachon, EPA

General comments

CRWI believes that the method to demonstrate destruction of organic chemicals by hazardous waste incinerators is already in place. This method is a destruction and removal efficiency (DRE) test as required in 40 CFR 63.1219(c). To make this demonstration, the facility must conduct a test proving they can destroy at least 99.99% of an organic compound that is more difficult to destroy than the compounds they would normally combust. In the process of conducting that test, operating parameter limits are established so the facility can demonstrate continuous compliance. This concept was developed early in the regulation of hazardous waste incinerators under Subpart O of the RCRA. In the guidance document for hazardous waste incinerators,¹ EPA discusses the concepts for demonstrating DRE for organic hazardous waste. In the opening paragraphs of this guidance document, EPA explains this concept.

“The Subpart O regulations require that POHC’s (Principal Organic Hazardous Constituents) be designated for each waste feed. The required DRE must then be demonstrated for the POHC’s during the trial burn. Since the POHC’s must be representative of the waste feed, they are chosen on factors such as difficulty to incinerate and concentration in the waste feed. The operator is then limited in the permit to burning only waste containing hazardous constituents no more difficult to incinerate than the POHC’s for which compliance was demonstrated during the trial burn.”

This guidance gives detailed instructions on selecting POHCs and the entire process of demonstrating DRE. Hazardous waste combustion facilities have used this guidance since 1989 to demonstrate the ability to meet these criteria. Appendix VIII of the guidance contains a list of organic compounds ranked on how difficult they are to destroy (incinerability index). This idea was initially suggested by the researchers at the University of Dayton.² Class 1 chemicals on this list are the most difficult to destroy. For example, chlorobenzene is a Class 1 chemical. When a facility demonstrates a minimum DRE of 99.99% for chlorobenzene, it is inferred that the facility can destroy a similar or greater percentage of any organic chemical ranked lower in Class 1 or any chemical in Classes 2 through 7.

Thus, the method for demonstrating the destruction of organic compounds is to conduct a test where the facility selects one or more POHCs that is at least as difficult to destroy as the constituents in waste feed and prove they can destroy at least 99.99% of those POHCs. In the process of conducting a successful DRE test, the facility sets the operating limits that are used to demonstrate continuous compliance with the DRE requirement. While per- and polyfluoroalkyl substances (PFAS) have some unique properties, in the end, they are organic compounds. CRWI believes that the established

¹ *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

² Dellinger, B. and D. L. Hall. 1986. *The Viability of Using Surrogate Compounds for Monitoring the Effectiveness of Incineration Systems*. Journal of the Air Pollution Control Association, 36:179-183

POHC selection and DRE testing process can be used to demonstrate destruction of PFAS compounds.

However, some of the information needed by hazardous waste incinerators to use the method described above for PFAS compounds is missing. In particular, information is needed on where PFAS compounds fit into the incinerability index and methods need to be validated to measure both PFAS compounds and any fluorinated products of incomplete combustion (PIC) formed during the combustion process. While CRWI members believe the formation of fluorinated PICs will be minimal in a well operated incinerator, measurement methods to prove this are needed.

At this point in time, there are no PFAS compounds listed in the incinerability index. However, there have been a limited number of studies that indicate where certain PFAS wastes fit within this index. In 2001, 3M commissioned a series of tests on the thermal degradation of perfluorooctanesulfonic acid (PFOS) and two C8 perfluorosulfonamides (FC-1395 and FC-807A). The report was issued in 2003 and submitted to EPA's docket.³ In the report, University of Dayton researchers demonstrated approximately 99.95% destruction of PFOS and the two C8's at 900 C with a 2 second residence time. Two studies were commissioned by DuPont. In the first,⁴ DuPont wanted to know if paper and textiles treated with fluorotelemer-based acrylic polymers would release perfluorooctanoic acid (PFOA) when combusted under conditions found in a typical municipal incinerator. In this study, University of Dayton researchers determined that the temperature at which 99.9% of the polymers by themselves were destroyed was 1000 C (with a 2 second residence time). For the paper and fabric coated with the polymers, 99.9% of the PFAS compounds were destroyed at 750 C (with a 2 second residence time). In the second DuPont study,⁵ University of Dayton researchers confirmed and extended the findings of the 2005 study.

The temperature and destruction percentage data from the studies mentioned above can be used to determine where the compounds evaluated in each of these studies fit into the incinerability index. CRWI's best estimate from the available data place the longer-chain PFAS compounds in the middle of Class 2. CRWI believes that additional research work is needed to determine where various other PFAS compounds fit within the incinerability index. This would give facilities more confidence in choosing the appropriate POHC when designing DRE test protocols. In addition, the Agency needs to supply guidance on what POHCs should be used when making a DRE demonstration for wastes containing PFAS compounds.

³ EPA-HQ-OPPT-2003-0012-0151

⁴ Yamada, T., P. Taylor, R. Buck, M. Kaiser, and R. Giraud. 2005. *Thermal degradation of fluorotelemer treated articles and related materials*. Chemosphere. 61:974-984.

⁵ Taylor, P., T. Yamada, R. Striebich, J. Graham, and R. Giraud. 2014. *Investigation of waste incineration of fluorotelomer-based polymers as a potential source of PFOA in the environment*. Chemosphere 110:17-22.

CRWI believes that the next draft of the guidance document should include the following information:

- What POHCs should be used to demonstrate that a facility can destroy PFAS containing wastes;
- Where selected PFAS compounds fit into the incinerability index;
- What fluorinated PICs should be measured; and
- What methods should be used to measure the PFAS and fluorinated PICs of interest.

With this information, hazardous waste incinerators would be able to use the DRE process to demonstrate destruction of the PFAS compounds in question as well as demonstrate minimal fluorinated PIC formation.

Specific comments

1. Starting on page 5, EPA ranked the possible treatment or disposal choices based on uncertainties with the technology. In addition, EPA ranked the technologies on greatest ability to control migration to the environment. The Agency states that “Performance and testing data—including data on destruction and removal of PFAS in hazardous waste combustors and associated pollution controls, and long-term performance data for landfills and deep well injection—are insufficient to support more specific guidance at this time.” CRWI would like to point out that the uncertainties in all of the technologies make it somewhat arbitrary for the Agency to rank any of the three disposal and/or destruction technologies and suggest these rankings be removed until additional information is available.
2. When describing the number of combustors that are operating in the United States, the guidance uses facilities for some groups (hazardous waste combustors) and units for others (sewage sludge incinerators). While the numbers may be accurate, CRWI suggests that comparing number of facilities with numbers of units is confusing. We suggest that in the next draft of the guidance, the Agency pick one metric and use it for all.
3. EPA has released OTM-45. This should be corrected in the next iteration of the guidance document.
4. One of the questions EPA asked is what are the operating temperatures adequate to completely destroy PFAS? The answer to that question will be site-specific. Destruction will depend upon a combination of time, temperature, turbulence, and operating conditions. All of these parameters are established during a DRE test. There is no one answer to this question. On page 46, the guidance references a 2020 DRE test at Chemours’ North Carolina facility where the facility demonstrated >99.999% DRE for five PFAS compounds. There is also 2019 test data available for

the Moose Creek, Alaska facility that has not yet been released to the public. CRWI encourages EPA and the Department of Defense to release these data and include them (and any other destruction data available) in the next iteration of the guidance.

5. Another question asked was can surrogate DRE or total organic fluoride (TOF) indicators be reliable to ensure fluorinated PICs are controlled? In relation to the DRE part of the question, the answer is yes if a hazardous waste facility has the proper POHC and validated measurement methods. CRWI is not sure how a total organic fluorine method would play into this demonstration.
6. EPA provides an extensive list of planned research and development activities on the disposal and destruction of PFAS containing materials. They also include a list of future data needs. CRWI supports this research but suggests that one critical research area has been omitted. CRWI believes that knowing where various PFAS compounds fit into the incinerability index is critical to be able to use the DRE method for demonstrating destruction. We suggest the Agency should fund research to answer this question.