ERM MARKET UPDATE

USEPA Interim Guidance on the Destruction and Disposal of PFAS

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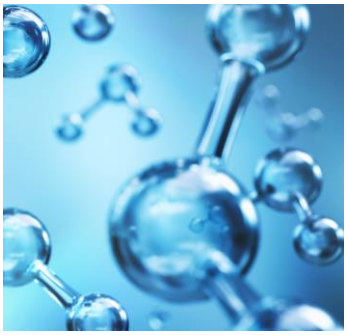

USEPA released its interim guidance document on the destruction and disposal of Per- and Polyfluoroalkyl Substances (PFAS) in December 2020.

Highlights of the Guidance

The scope of the guidance relates to three destruction and disposal technologies (thermal treatment, landfilling, and underground injection) that are available for six types of PFAS materials specified in the National Defense Authorization Act for Fiscal Year 2020:

- aqueous film-forming foam;
- soil and biosolids;
- textiles, other than consumer goods, treated with PFAS;
- spent water treatment filters, membranes, resins, granular carbon, and other treatment waste;
- landfill leachate containing PFAS; and
- solid, liquid, or gas waste streams containing PFAS from facilities manufacturing or using PFAS.

This USEPA Interim Guidance focuses on three technologies for destruction/disposal of PFAS:

Thermal treatment

Landfill disposal

Deep well Injection

Due to uncertainties with these technologies, the Agency proposes that interim storage of PFAS wastes may be appropriate

In this guidance, USEPA presents the pros and cons associated with current destruction and disposal technologies that have the potential to destroy PFAS (break carbon–fluorine bonds) or control the migration of PFAS in the environment. Notably, all of the highlighted technologies are associated with some degree of uncertainty, often significant, which precluded the Agency from recommending one type of available technology over another in this document. **As a result, USEPA proposes that interim storage (from 2 to 5 years) may be an appropriate strategy until these uncertainties are addressed, after which more specific recommendations can be made.**

This document is interim guidance, not USEPA policy or rulemaking, and does not speak to what concentrations of PFAS in wastes, spent products, or other materials or media would require destruction or disposal. The Agency recommends a risk-based process or other regulatory mechanisms to establish these thresholds. The overall objective for this guidance is to enable informed decision-making by managers of PFAS or PFAS-containing materials in the evaluation of existing destruction and disposal options. Ultimately, however, the message is that no optimal solutions are available at this time.

Technologies for the Destruction and Disposal of PFAS

Thermal Treatment

Thermal treatment (hazardous or non-hazardous waste combustion, carbon reactivation, and thermal oxidation) is currently the only technology available for PFAS destruction. However, thermal treatment is also associated with the greatest degree of uncertainty relative to PFAS migration control. The concerns include:

- The design and operating conditions of different combustion technologies (commercial incinerators, cement kilns, and lightweight aggregate kilns) vary widely and USEPA currently lacks destruction efficacy data as well as emission characterization data from these sources when they burn PFAS.
- The incomplete destruction or recombination of reactive intermediates may result in the formation of new PFAS or other products of incomplete combustion (PICs). Emission studies, particularly for PICs, are largely incomplete due to lack of validated sampling and measurement methods for the potentially large number of fluorinated and halogenated compounds that might be formed.
- Emission control devices on thermal treatment systems produce secondary waste streams of PFAS-containing solid (bottom/fly ash) and liquid (scrubber water) by-products.

USEPA is planning to conduct additional research to better characterize PFAS destruction efficacy, emission control efficiency, and PFAS-containing by-products from thermal treatment devices.

Landfilling

Landfilling PFAS waste was ranked second in terms of uncertainty, with permitted hazardous waste landfills (RCRA Subtitle C) preferable to municipal solid waste landfills (RCRA Subtitle D). In both cases, even when extensive environmental controls are in place (e.g. liner systems, leachate controls), USEPA cautions that PFAS behavior and containment in landfills is unknown, and further research is needed on the following:

- effects of PFAS on liner integrity;
- PFAS emissions in landfill gas;
- effectiveness of leachate treatment for PFAS removal; and
- levels and types of PFAS in landfill leachate.

The persistence of PFAS wastes in landfills will result in legacy PFAS issues that will remain far into the future when the liner or cap "inevitably" fails, or if the waste is removed as part of a future management action.

Underground Injection

Permitted (Class 1) deep well injection was ranked as having the least uncertainty related to unintended PFAS migration. However, this technology is limited to liquid waste streams meeting certain characteristics (e.g. low suspended solids), and the availability and costs associated with this method of disposal are severely constraining.

Vulnerable Populations

USEPA includes guidance on the need to assess the potential releases of PFAS that may reach vulnerable populations living near destruction or disposal sites. Exposure pathways include

stack emissions from thermal treatment sites and management of process residuals; landfill gas and leachate impacts to surface or groundwater from landfill sites, and releases from increased transport, management, and handling of waste associated with all of the available technologies. USEPA emphasizes risk assessment and risk communication tools to address these concerns.

Going Forward

USEPA and the United States Department of Defense are leading a research and development program to address the key gaps in the current state of scientific research with respect to PFAS destruction and disposal. These efforts are focused improving thermal treatment options, wastewater treatment operations and the disposal of wastewater treatment residuals, as well as the management of PFAS waste in landfills.

Key contacts

For more information, contact your current ERM consultant or one of the following experts below:

Maureen.Leahy@erm.com (CT, USA)

Natalie Goodrich@erm.com (KS, USA)