Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances

Released for Public Comment on December 18, 2020

Section 7361 of the FY 2020 NDAA required EPA to:

- Publish interim guidance on the destruction or disposal of PFAS and PFAS containing materials including six specific PFAS containing materials
- Take into consideration the potential for PFAS releases during destruction or disposal and potentially vulnerable populations living near likely destruction or disposal sites
- Provide guidance on testing and monitoring for releases near potential destruction or disposal sites
- Revise the interim guidance at least every 3 years, as appropriate

Agency Approach to Interim Guidance

- Developed by a workgroup of EPA subject matter experts
- Includes commercially available technologies that have the potential to destroy or control the migration of PFAS
- Explains what is known and not known about each technology
- Highlights EPA's PFAS research program and ongoing research needs
- Posted for public comment to EPA website on Dec. 18, 2020
- Published for public comment in the Federal Register on Dec. 22, 2020
- See www.epa.gov/pfas to review and provide comments!

Interim Guidance Provides Scientific Information on:

- Manufacture and use of PFAS and PFAS-containing materials
- Three destruction or disposal technologies:
  - Thermal treatment
  - Landfills
  - Underground injection
- Assessment of impacts of potential releases on communities, including potentially vulnerable populations
- EPA's PFAS research program and research needs

PFAS Containing Materials Identified in the FY 2020 NDAA

- The interim guidance covers the six PFAS containing materials:
  1) aqueous film-forming foam;
  2) soil and biosolids;
  3) textiles, other than consumer goods, treated with PFAS;
  4) spent filters, membranes, resins, granular carbon, and other waste from water treatment;
  5) landfill leachate containing PFAS; and
  6) solid, liquid, or gas waste streams containing PFAS from facilities manufacturing or using PFAS.

- Discusses:
  - Origins
  - Potential sources of PFAS
  - Current disposal and treatment methods
  - Potential releases to the environment

Destruction and Disposal Technologies

- Includes the following information, where available, on thermal treatment, landfills, and underground injection:
  - Types of treatment within the technology
  - Ability to destroy/contain PFAS, and control measures for PFAS if not destroyed
  - Potential for releases
  - Testing and monitoring
  - Uncertainties/unknowns
  - Costs and commercial availability

Thermal Treatment

- Hazardous waste combustors can potentially achieve temperatures to break the carbon-fluorine bond
- Can achieve 99.99 % destruction of other organic chemicals but info is incomplete on the efficacy of PFAS destruction
- Key uncertainties include:
  - Operating temperatures adequate to completely destroy PFAS – break all C-F bonds
  - Formation and ID of Products of Incomplete Combustion (PICs)
  - Lack of emissions characterization data/emission control efficiency
  - Lack of sampling and analytical methodologies
    - —Emissions
    - —PICs

Landfills

- Permitted hazardous waste landfills employ the most extensive environmental controls to contain waste
- Permitted municipal solid waste landfills with leachate and gas collection and treatment systems can control chemical migration
- Proper management of gaseous and liquid releases is needed to minimize PFAS migration to the environment
- Uncertainties include:
  - Understanding of long-term PFAS fate and migration in landfills
  - Lack of information on the amounts and concentrations of PFAS and precursor compounds in wastes
  - Lack of sampling and analytical methodologies
  - Efficacy of leachate and gas treatment for PFAS

Underground Injection

- Permitted deep injection wells (Class I) for hazardous and non-hazardous materials should minimize migration of PFAS into the environment
- Limitations include:
  - Only liquid waste streams
  - Availability of Class I wells
  - Suitability of geology for development of new Class I wells
  - Cost
- Uncertainty:
  - Limited understanding of the long-term fate and transport properties of PFAS (including precursors) in the deep injection zone

Hierarchy of Destruction & Disposal Technologies

- The interim guidance presents a hierarchy based on the current level of uncertainty:
  1. Interim storage if immediate destruction or disposal is not required
  2. Permitted deep well injection (Class I)
  3. Permitted hazardous waste landfills (RCRA Subtitle C)
  4. Solid waste landfills (RCRA Subtitle D) that have composite liners and leachate collection and treatment systems
- Due to higher levels of uncertainty, EPA advises considering interim storage before treatment in:
  5. Hazardous waste combustors
  6. Other thermal treatment devices

Hierarchy of Destruction & Disposal Technologies (cont.)

- EPA encourages the PFAS materials manager, hazardous waste combustion facility, and the State to work with EPA on protocols for monitoring, emissions testing and data sharing.
  - The findings will support ongoing research and may allow for more specific recommendations when the interim guidance is updated
  - Comments on how such a collaborative effort would work best are welcome in comments on the interim guidance
- EPA encourages PFAS materials managers to provide disposal and destruction facilities with the relative PFAS concentrations of the waste materials being treated or disposed

PFAS Destruction or Disposal & Potentially Vulnerable Populations

- Interim guidance includes considerations for potentially vulnerable populations living near likely destruction or disposal sites
  - Provides EPA's existing definition of potentially vulnerable populations and links to related guidance
  - Provides a description and links to EPA's existing guidance on considering vulnerable populations when assessing the potential impact of releases
  - Provides links to EPA's tools on the development of risk assessments including incorporating vulnerability into risk assessment

Research Needs on PFAS Destruction & Disposal

- The interim guidance identifies three broad areas where further research is needed:
  1. Research to better characterize PFAS-containing materials targeted for destruction or disposal
  2. Research to measure and assess the effectiveness of existing methods for PFAS destruction, improve existing methods, and/or develop new methods for PFAS destruction
  3. Research to measure and assess the effectiveness of existing methods for PFAS disposal, improve existing methods, and/or develop new methods for PFAS disposal
- EPA, DoD, and others are conducting relevant research under each of these research areas

EPA Research on PFAS Destruction & Disposal

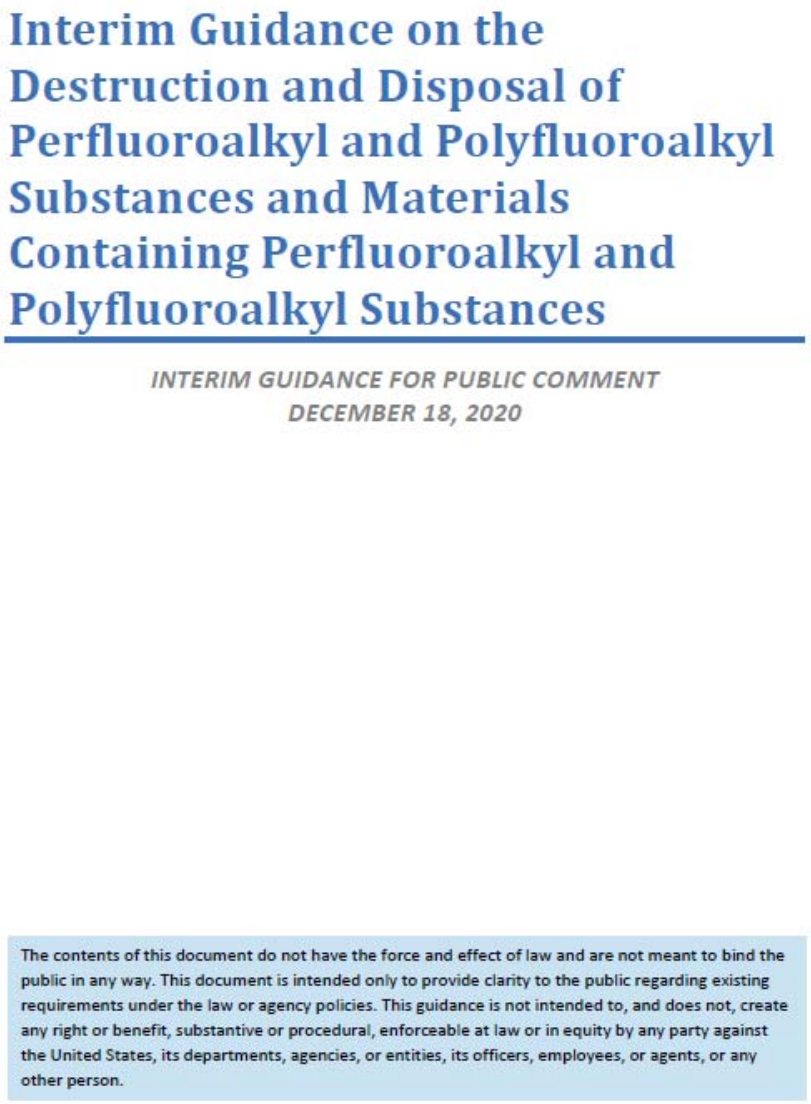
- EPA's robust PFAS research and development program includes near-term research on:
  - Methods for sampling and analyzing PFAS and PFAS-containing media and waste
  - Incineration conditions needed to fully defluorinate PFAS (break all C-F bonds)
  - Effectiveness of full-scale PFAS incineration operations
  - Review and testing of novel and available PFAS destruction solutions
  - PFAS destruction efficiency during reactivation, regeneration, and disposal of PFAS-containing treatment media (e.g., GAC and ion exchange resins)
  - PFAS management in landfills
  - Alternate PFAS treatment methods for disposal and destruction
- Additional information on EPA's PFAS research is available at https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas

High-Priority Information Needs

- EPA is seeking data and information to inform future guidance updates
  - Data generated through pilot tests of sampling and analysis methods for PFAS in stack emissions
  - Data generated through thermal treatment tests of different PFAS and PFAS-containing materials under different operational conditions
  - Data and information about approaches for efficiently controlling the emission of PICs
  - Data on PFAS that may be present in air pollution control device media and bottom ash
  - Data on PFAS management in landfills, including presence of PFAS in leachate and PFAS migration from unlined landfills
- EPA seeks collaborative access to facilities to generate additional data to address information gaps

Next Steps

- Comments due on the interim guidance by February 22, 2021
- See www.epa.gov/pfas for the interim guidance and docket link
- For your comments to be considered in a future revision of the interim guidance, please upload them to the docket by February 22, 2021!



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INTERIM GUIDANCE FOR PUBLIC COMMENT
DECEMBER 18, 2020

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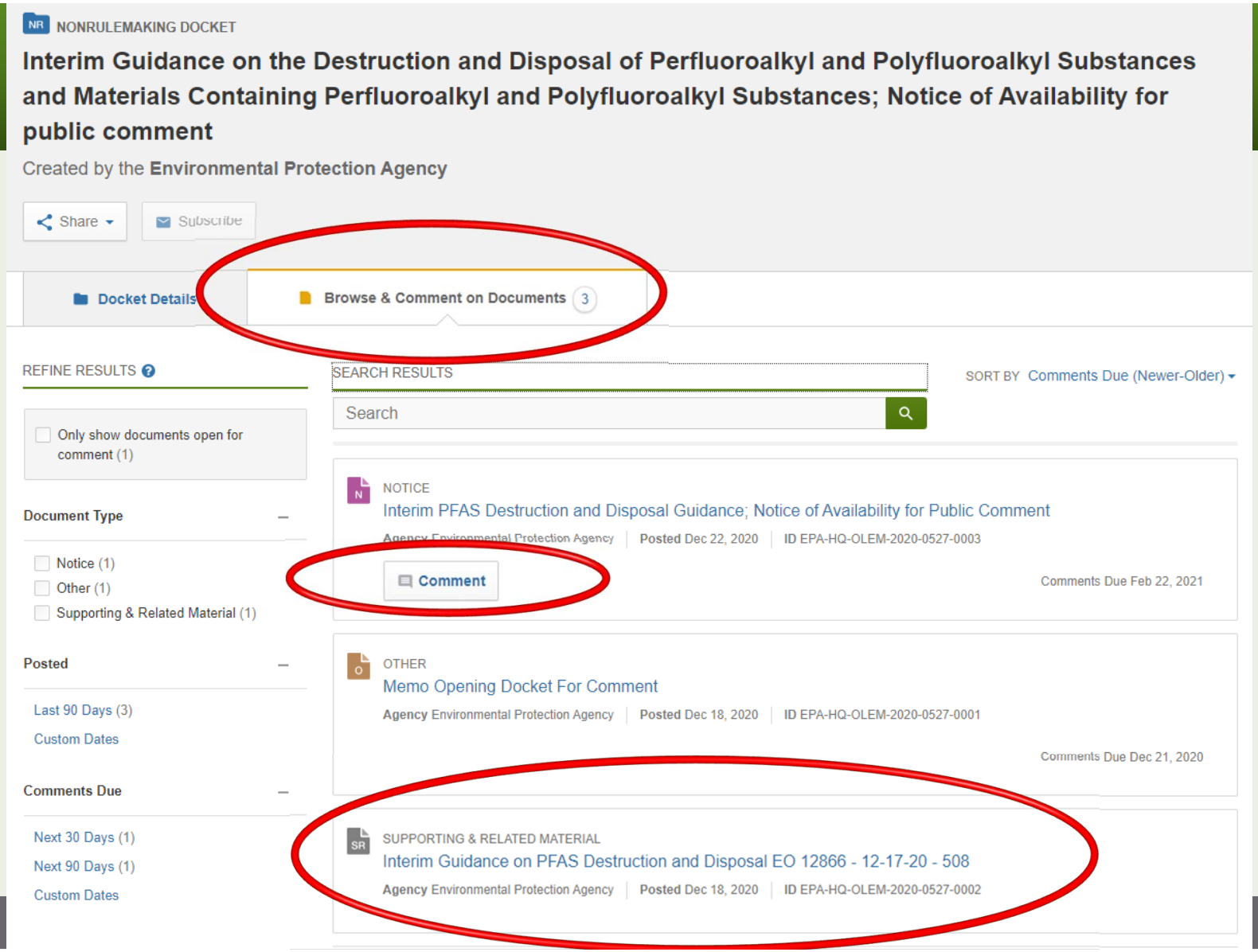
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Comments Due Dec 21, 2020
SUPPORTING & RELATED MATERIAL
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Agency Environmental Protection Agency | Posted Dec 18, 2020 | ID EPA-HQ-OLEM-2020-0527-0002