

Meeting the Challenge of Aqueous PFAS Wastewater Management

MWCC Conference

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Challenges of Aqueous PFAS Management

- **PFAS in The Twilight Zone**
- **Current Regulatory Environment**
- **EPA Interim Guidance on PFAS**
- **Disposal and Destruction Options**
- **Proposed New Regulation, TSCA PFAS Reporting Highlights Gathering**
- **Opportunities**
- **Summary**
- **Questions**

Challenges of Aqueous PFAS Management

PFAS in The Twilight Zone

- **The Twilight Zone**
 - » Not hazardous but in some cases PFAS waste is treated as if was very hazardous
 - » Science vs. Perception, Shadow vs. Substance.
 - Maximum Contaminant Levels (MCLs) has not been established
 - Toxicity of wider range of PFAS compounds is yet to be determined
 - Indicators of future regulation
 - Non-specific proposed regulations
- **The numbers 2, 172, and 1364 regarding PFAS Regulation**
- **Current Regulations, Federal**
 - » No Treatment Standards
 - » No designation as a hazardous waste, hazardous substance, or hazardous material.
 - » No Federal Maximum Contaminant Level (MCL)
 - » There is a non-binding Health Advisory for a few PFAS compounds.
- **Current Regulations, State.** In the absence of Federal regulations, a number of states have adopted regulations of their own. One State has actually banned the burning of Fluorinated Fire Foams in a RCRA incinerator.
- **Many Proposed Regulations and Congressional Action**
 - » PFAS Reporting
 - » PFAS restrictions in commercial products

Challenges of PFAS Wastewater Management

Current Regulatory Environment

- **PFAS Regulatory Environment**

- » Risk to drinking water is the major driving force
- » Currently Non-Hazardous (unless comingled with hazardous waste)
- » No uniform discharge or emission standards, currently State to State
- » Uncertain regulation of PFAS compounds (CERCLA, Hazardous Waste)
- » Some TRI regulations are in place for 172 PFAS compounds (100 lb. threshold)
- » Recent concern about complete combustion and air transport in incinerators
- » Growing desire to regulate many PFAS not just PFOA and PFOS.
- » Technology is not normally prescribed by regulators. In the case of Fluorinated firefighting foam, some states are prohibiting specific disposal technologies.
- » Growing number of states testing POTWs for PFAS and not just PFOA and PFOS.
- » Landfill leachate is coming under increased scrutiny. Many already using carbon and/or reverse osmosis.

- **PFAS Regulation and Drivers**

- » Environmental Justice, and Community Involvement
- » Lawsuit Agreements, Consent Orders, and General Duty Clauses
- » Retroactive Liability

Challenges of PFAS Wastewater Management

EPA Interim Guidance on PFAS

- EPA issued an Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Perfluoroalkyl Substances on December 18, 2020. The 60 days public comment period ended on February 22, 2021.
- What is the reason for report?
 - » Meet requirements of FY 2020 NDAA
 - » Provides information on current commercially available technologies to manage PFAS materials.
- What PFAS Materials does it cover?
 - » Aqueous Film Forming Foam (AFFF)
 - » Soil and Biosolids
 - » Textiles
 - » Spent water treatment materials like filters, granular activated carbon, ion exchange resins.
 - » Landfill Leachate
 - » Waste streams from facilities that use PFAS.

Challenges of PFAS Wastewater Management

EPA Interim Guidance on PFAS, continued

- What the guidance does not do
 - » Set treatment or discharge standards
 - » Does not specify what technology to use. Guidance only.
 - » Limit types of treatment or destruction technologies.
- Includes additional research for new technologies.
- Includes consideration of potential vulnerable populations at TSDFs accepting PFAS wastes
 - » Releases
 - » Identify vulnerable populations
 - » Health effects
 - » Participation of vulnerable populations in permitting
 - » Vulnerability as part of risk assessment
 - » Community engagement
- Ranks available technologies in terms of levels of uncertainty concerning environmental and health risk.

Disposal and Destruction Options In Order of Lowest Uncertainty

- Storage
- Class 1 Hazardous Underground Injection
- Class 1 Non-Hazardous Underground Injection
- Hazardous Waste Landfill, Subtitle C
- Non-Hazardous Waste Landfill, Subtitle D
- Hazardous Waste Incineration
- Other Thermal Treatment

Disposal and Destruction Options Storage

Positive

- As long as waste is stored there are not any discharges or emissions.
- Wait on new technology or postpone decision making

Uncertainties

- Potential limits on storage
- Risk of leaks in containers

Disposal and Destruction Options

Class 1 Hazardous Underground Injection

Positives

- No discharges or emissions
- Manage as if hazardous waste (permits, facility)
- Address future regulations, i.e. RCRA, CERCLA, TRI.
- Rigorous geologic siting criteria as part of EPA No Migration Petition (NMP).
- Use with volume reduction technologies like Reverse Osmosis and Soil Evaporation

Uncertainties

- Capacity
- Cost of shipment to a commercial facility
- Permitting process for new wells is long and potentially difficult.
- Primarily for liquids

Disposal and Destruction Options

Class 1 Non-Hazardous Underground Injection

Positives

- Low/No discharge or emissions
- Easier permit process
- Minimize migration of fluid

Uncertainties

- Concern about fate of fluid
- Siting criteria not as rigorous as a hazardous well.
- Transportation cost
- Capacity
- Future “hazardous” regulations or designation

Disposal and Destruction Options

Hazardous Subtitle C Landfill

Positives

- Hazardous Waste Permit
- Good containment for long term storage

Uncertainties

- Discharges and emissions
- Persistence of PFAS in landfills
- Leachate treatment or disposal.
- Impact of future regulation

Disposal and Destruction Options

Non-Hazardous Subtitle D Landfills

Positives

- Good containment

Uncertainties

- Emissions
- Landfill gas
- Capacity for liquids
- Leachate
- Persistence of PFAS
- Future regulations

Disposal and Destruction Options

RCRA Incinerators and Hazardous Waste Kilns

Positives

- Destructive Technology
- RCRA Hazardous Waste Permit
- EPA is working to address uncertainties and establish operating conditions

Uncertainties

- Capacity
- Incomplete destruction questions to be resolved
- Questions on air emissions, scrubber water, and ash
- Cost

Disposal and Destruction Options Other Combustion Units

Positives

- May have a role to play in overall management
- May benefit by work on combustion solutions at RCRA incinerators

Uncertainties

- Destruction efficiencies will vary with technology
- Emissions, discharges, and residues

Proposed New Regulation, TSCA PFAS Reporting Highlights

- Published in Federal Register on June 28, 2021. 60 days comment period ends on August 27, 2021.
- Requires detailed reporting on all aspects of PFAS management including amounts, potential exposures to workers, and disposal (air, land, water, on-site treatment, and off-site disposal).
- Includes manufacturers and importers of PFAS to include manufactures of byproducts. No exemption for “small” manufacturers.
- Includes 1346 PFAS compounds, of which 669 are active in US commerce.
- Excludes pesticides, food additives, cosmetics, drugs, and devises.
- Intention is to give EPA better idea of exposure and potential health and environmental.
- Report is for all covered activity since 1/1/2011.
- “Reasonably ascertainable” standard. Reasonable estimates based on all normal resources.
- Initial report will be due 6 months after 6 months of final rule (1 year total)

Challenges of PFAS Wastewater Management Opportunities

- **On-site and off-site work**
- **Consulting, legal assistance, remediation, projects, and on-going work (including re-evaluating other remediation that was proposed before PFAS contamination became an issue)**
- **Wastewaters, leachates, firefighting water, and groundwater**
- **Industries with PFAS**
 - » Chemical companies
 - » Leather tanning
 - » Specialty paper
 - » Chrome plating (legacy fume suppressants)
 - » Landfills (leachates, biosolids, gas recovery)
 - » US Military and airlines (firefighting foam and water)
 - » Oil refineries (firefighting foam and water)
 - » Storage terminals (firefighting foam and water)
 - » Others including cosmetics, lubricants, fabrics, etc.
- **National, with special emphasis in NE and Midwest**
- **We are still in the early stages of PFAS waste management. Very large potential for management of PFAS.**

Challenges of Aqueous PFAS Management

Summary

- Comprehensive Federal regulations are not yet in force. The amount and type of new initiatives makes it is clear that regulations are coming.
- The EPA is not ruling out any technologies for PFAS disposal as there is a recognition that capacity will be important aspect of management of PFAS wastes when regulations are finalized.
- The rankings provided in the Interim Guidance for information are based on “least uncertainty” and are differentiated by hazardous and non-hazardous within each technology. The Hazardous version of each technology offers less uncertainty due to more rigorous permitting, and in the case of hazardous injection wells, much more rigorous geologic siting criteria. The regulated community is to make their own choices of PFAS management technology based on the own risk profile.
- PFAS regulation will continue to be in the Twilight Zone. The EPA proposed programs and proposed Congressional action offer indications of the direction of regulations.
- Questions to be resolved

Challenges of Aqueous PFAS Management

References

- EPA Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances, December 18, 2020.
- TSCA Section 8(a)(7) Reporting and Recordkeeping Requirements for Perfluoroalkyl and Polyfluoroalkyl Substances, Federal Register, Volume 86 FR 33926, June 28, 2021.

Questions?

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