"Forever Chemicals" Disposal Is Creating a Health Nightmare

EPA is Failing to Control Spreading Web of PFAS Waste

November 9, 2023

Overview

New data compiled by the U.S. Environmental Protection Agency (EPA) depicts a growing danger to public health and the environment from a vast, uncontrolled, and spreading web of unregulated disposal of per- and polyfluoroalkyl substances (PFAS) waste.

EPA estimates there are more than 14,000 different PFAS, although only roughly 300 are currently being used in commerce. Human exposure to PFAS is associated with cancer, birth defects, developmental damage to infants, and impaired functioning of the liver, kidneys, and immune system. Because PFAS are highly persistent and many are highly mobile, PFAS in waste will often cycle back into the environment, where it will continue to poison the air we breathe and the water we drink.

The EPA's data come from the agency's *PFAS Analytical Tools*, which collects information from EPA's electronic manifest system. The *PFAS Analytical Tool* has information on about 10,344 shipments of almost 27 million kilograms of waste contaminated with PFAS between June 2018 and June 2023. Common disposal methods for these PFAS wastes include incineration, landfilling, mixing with other fuels and burning it, discharging it into wastewater treatment systems, and injecting it underground.

The data, analyzed by Public Employees for Environmental Responsibility (PEER), underscores the urgent need for EPA to regulate PFAS under the Resource Conservation Recovery Act (RCRA) Subtitle C. This provision of RCRA authorizes EPA to set regulatory standards for the management of hazardous waste from the moment the waste is generated until its final disposal (known as cradle-to-grave management). PEER petitioned EPA to regulate PFAS under RCRA Subtitle C on September 19, 2019, but has yet to receive a response from EPA. On January 15, 2020, on behalf of the Green Science Policy Institute and community groups nationwide whose drinking water is contaminated with PFAS, the Environmental Law Clinic at the University of California at Berkeley also petitioned EPA to designate hundreds of known-dangerous PFAS chemicals as "hazardous waste," and regulate them stringently from cradle to grave.

In October 2021, EPA said it intended to add four PFAS chemicals, PFOA, PFOA and PFBS, and GenX to the list of RCRA "hazardous constituents."[i] As of November 8, 2023, EPA had not taken steps to implement this proposal. Listing the chemicals as hazardous constituents would trigger clean-up authority under RCRA's "corrective action" program but would do nothing to prevent future contamination.

EPA's recent approval of the importation of almost 4.4 million pounds of PFAS waste into the United States from the Netherlands for reclamation and disposal is further evidence of the need for EPA to set standards for PFAS waste management. EPA's weak standards means the U.S. will be an attractive dumping ground for companies in other countries wanting to offload their PFAS waste. Given the serious public health and environmental risks associated with PFAS waste management, EPA should prohibit the importation of PFAS waste into the country.

Without "cradle-to-grave" management under RCRA Subtitle C, PFAS contamination will continue to grow, imposing tremendous financial, health, and environmental costs on society while allowing those who created the problem to avoid or minimize financial responsibility for the harm caused by this waste.

Please **click here** for a link to the data used in this report.

The Data Show a Vast and Uncontrolled Trade in PFAS Waste

The EPA data reveal the transfer of about 10,344 shipments of almost 27 million kilograms of waste contaminated with PFAS between July 2018 and June 2023. EPA's PFAS Analytical Tools contains information from 5,568 manifests. These manifests contain information on 1,371 Generators of PFAS waste, 126 destinations for these wastes, and the management method used on these wastes. Many of these manifests also contain information on the types of PFAS or the source of the PFAS, such as Aqueous Film Forming Foam (AFFF), a fire suppressant used to extinguish flammable liquid, which has been a common source of PFAS contamination throughout the United States.

The data does not indicate the percentage of PFAS in the wastes. Companies regularly claim this is confidential business information (CBI), and therefore exempt from disclosure.

The data indicate the amount of PFAS reported in e-manifests has increased from June 2018, when EPA began collecting these data, to the present day.

- Between June and December 2018, there was an average of 139,267 kg of PFAS waste a month transferred.
- In 2019, there was an average of 190,208 kg of PFAS waste transferred each month.
- In 2020, there was an average of 682,325 kg of PFAS waste transferred each month.
- In 2021, there was an average of 425,867 kg of PFAS waste transferred each month.
- In 2022, there was an average of 546,547 kg of PFAS waste transferred each month. Between January and July 2023, there was an average of 545,734 kg of PFAS waste transferred each month.

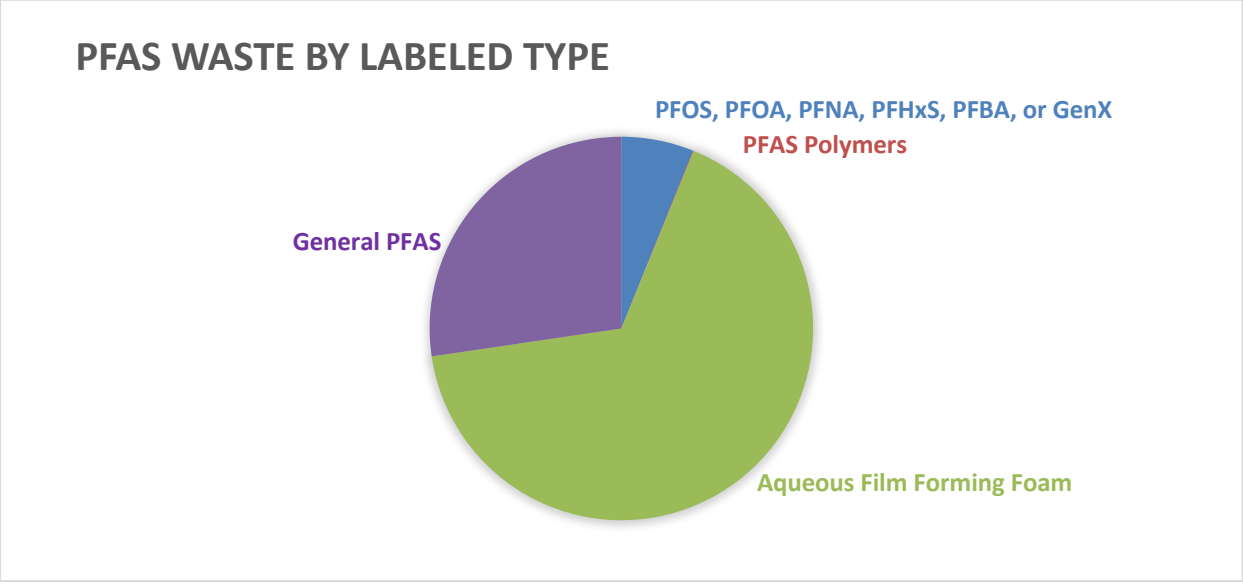
EPA's Data Vastly Underestimate the Extent of the PFAS Waste Problem

EPA's data likely significantly underestimate the amount of PFAS waste being generated, shipped and disposed of in the United States. EPA pulled these data from hazardous waste electronic manifests and state waste code searches. However, since PFAS is not regulated as hazardous waste under the RCRA, companies generating, shipping, and disposing of PFAS waste are not required to disclose this on their manifest. Companies providing this information on their manifests did so voluntarily, leading us to conclude that the data provided on EPA's PFAS Tracker likely represent only a fraction of the total PFAS waste, and only partially describes which PFAS or PFAS products are in the waste.

In addition to the lack of data, PFAS pose serious waste management issues. PFAS are incredibly resistant to degradation, to the point that many essentially do not degrade in the environment or the human body. Those PFAS that do degrade ultimately transform into stable terminal end products, which are themselves PFAS. Several PFAS boast biological half-lives (the time it takes for half of the chemical to leave your body) that can reach years in length. This means that even small exposures add up over time. The result is the use and disposal of PFAS have resulted in PFAS being detectable in the blood of nearly every human on Earth.

The Stockholm Convention on Persistent Organic Pollutants indicates PFAS waste should either be stored in a controlled area that protects against leaching to the environment, or thermally destroyed at a minimum 1,100°C/2,012°F. It is important to note that because we can only test for roughly 70+ individual PFAS, we cannot be sure that thermal destruction will adequately protect us from PFAS contamination. For example, one PFAS, tetrafluoromethane (CF4), has a degradation temperature of approximately 1200–1400 °C (2192 – 2552 °F), which would not be destroyed by the Stockholm Convention's suggested protocol.

Information on the Types of PFAS in Waste: June 2018 through June 2023



IDENTIFICATION OF PFAS	% of total waste	kg of PFAS Waste
PFOS, PFOA, PFNA, PFHxS, PFBS, or GenX ("Six PFAS")	6%	1,637,461
PFAS Polymers	>0%	16,627
Aqueous Film Forming Foam	67%	17,854,107
General PFAS	27%	7,336,414
TOTAL	100%	26,845,511

EPA data indicates that 1.6 million kg of the PFAS waste were labeled as PFOS, PFOA, PFNA, PFHxS, PFBS, and GenX. EPA is proposing to regulate these six PFAS under the Safe Drinking Water Act. PFOA and PFOS, and PFNA to a lesser extent, are the PFAS historically used most in commercial and industrial products (fluoropolymers, nonstick components, lubricants, water and oil resistant barriers, etc.). In the U.S., PFOS was voluntarily phased out of production and use in 2002, and U.S. manufacturers voluntarily pledged to eliminate PFOA emissions and product content at the end of 2015. Evidence of their use in these hazardous waste e-manifests would suggest their continued use as well as presence in PFAS waste. PFHxS and PFBS have been used as replacements for PFOS, and Gen X has largely been used as a replacement for PFOA.

Of the nearly 27 million kg of PFAS labeled waste almost 18 million kg of it was from Aqueous Film Forming Foam, a product often used in firefighting and a known contributor to PFAS contamination in the environment. While not labeled as such, AFFF often contain PFOS, PFOA, PFNA, PFHxS, PFBS, and GenX or PFAS that will break down into these six PFAS.

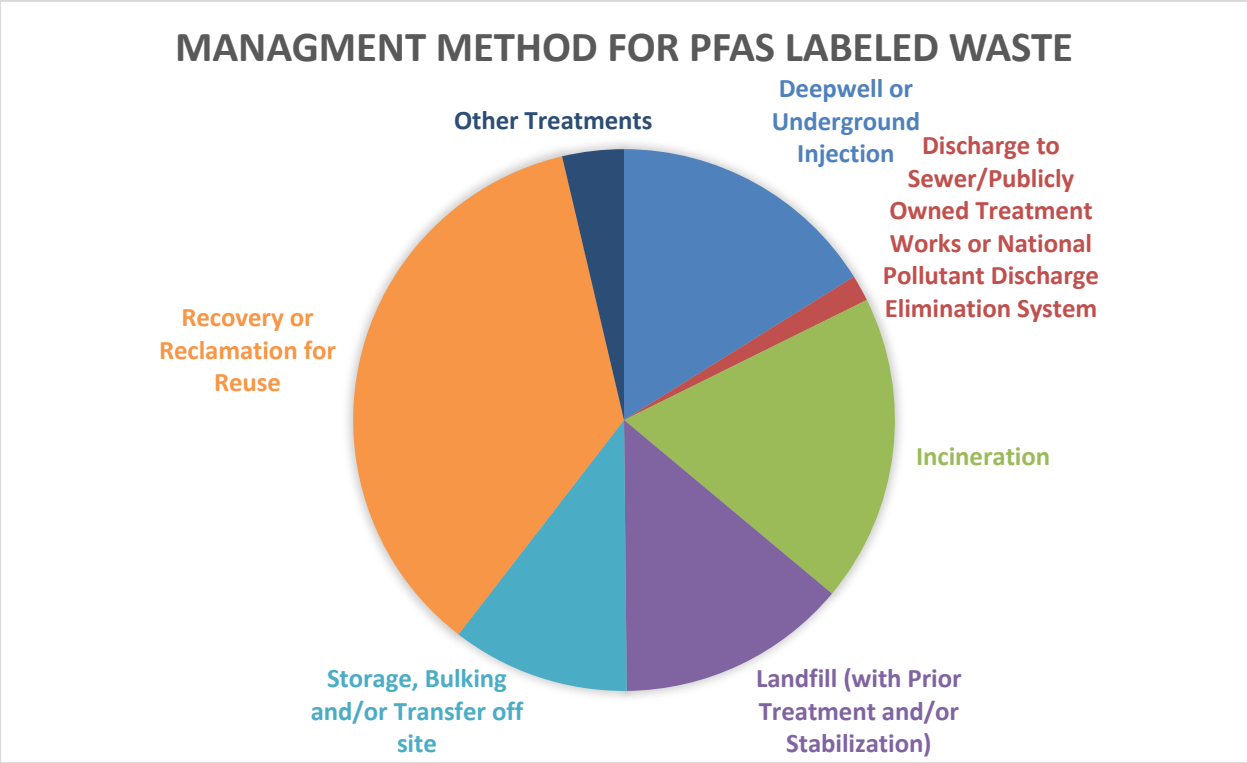
Most of the remaining PFAS waste, 7.3 million kg, were labeled as "general PFAS" (no specified chemical or a PFAS other than PFOS, PFOA, PFNA, PFHxS, PFBS, and GenX).

Methods of Disposal: June 2018 through June 2023

The data show that PFAS disposal takes place through a mix of incineration, landfilling, mixing with other fuels, discharging it into wastewater treatment systems, and injecting it underground. Since PFAS do not readily break down in the environment and current treatment methods are largely ineffective, the ultimate disposition of these chemicals after treatment and disposal remains largely unknown.

PFAS are largely resistant to most forms of incineration. As a result, incineration does very little to destroy these chemicals. In 2022, Congress required the Department of Defense to halt the practice of incinerating AFFF as it was shown to release PFAS into the air resulting in them falling on the surrounding communities. Landfilling PFAS has resulted in extensive groundwater contamination throughout the United States. One such case in Martin County, Minnesota resulted in groundwater PFAS concentrations more than 1000 times the state drinking water safety standard.

The largest listed method of management was “Recovery or Reclamation for Reuse,” where PFAS are extracted from waste and used again, which create new waste streams with PFAS. One method of reclamation is “Fuel Blending,” which uses suitable waste as a fuel in the creation of concrete. This results in the burning of PFAS laden waste at temperatures that may not result in their degradation.



Management Method	Percentage	kg of PFAS Waste
Deepwell or Underground Injection	16%	4,329,176
Discharge to Sewer/Publicly Owned Treatment Works or National Pollutant Discharge Elimination System	2%	419,643
Incineration	18%	4,934,574
Landfill (with Prior Treatment and/or Stabilization)	14%	3,696,470
Storage, Bulking and/or Transfer off site	11%	2,853,476
Recovery or Reclamation for Reuse	36%	9,625,976
Other Treatments	4%	986,196
Total		26,845,511

Sources and Destinations: June 2018 through June 2023

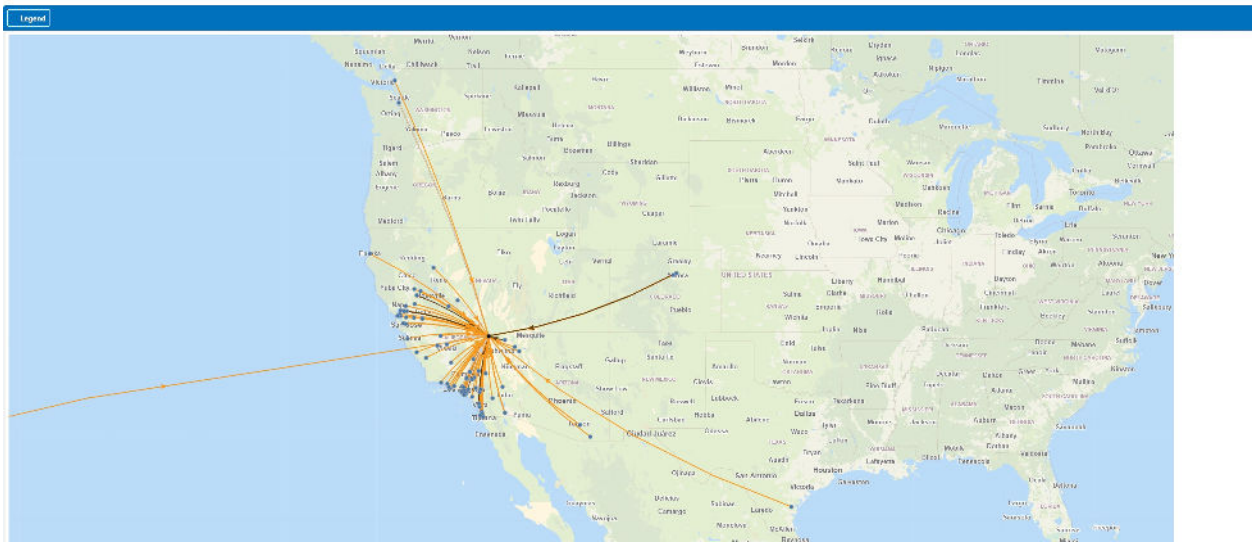
The PFAS Analytical Tools contains information of industrial users of PFAS and 1,371 generators of PFAS waste. These generators are listed only on electronic hazardous waste manifests. The data also indicate that facilities in 41 states reported receiving PFAS waste between June 2018 and June 2023.

The three largest sources of PFAS wastes listed in this database are Naval Base San Diego Building 3458 Hazardous Waste Facility, American Airlines, and The Chemours Company.

The San Diego Navel Bases' primary waste was labeled as AFFF. American Airlines' waste was also labeled as AFFF. Chemours, a spin-off from DuPont, is one of the largest manufactures PFAS products and PFAS polymers (like Teflon). There largest PFAS waste categories were "other PFAS," "Six PFAS", "PFAS polymers," and "AFFF".

The largest Receiver of PFAS Waste, US Ecology Nevada

US Ecology Nevada, outside of the small-town of Beatty, NV and Death Valley, was the largest receiver of PFAS Waste (8.3 million kg, with 7.8 million labeled as AFFF). Beatty is one of the hottest and driest places in the US. PFAS Dust from the US Ecology site is fully capable of drifting to the town and exposing the populous there.

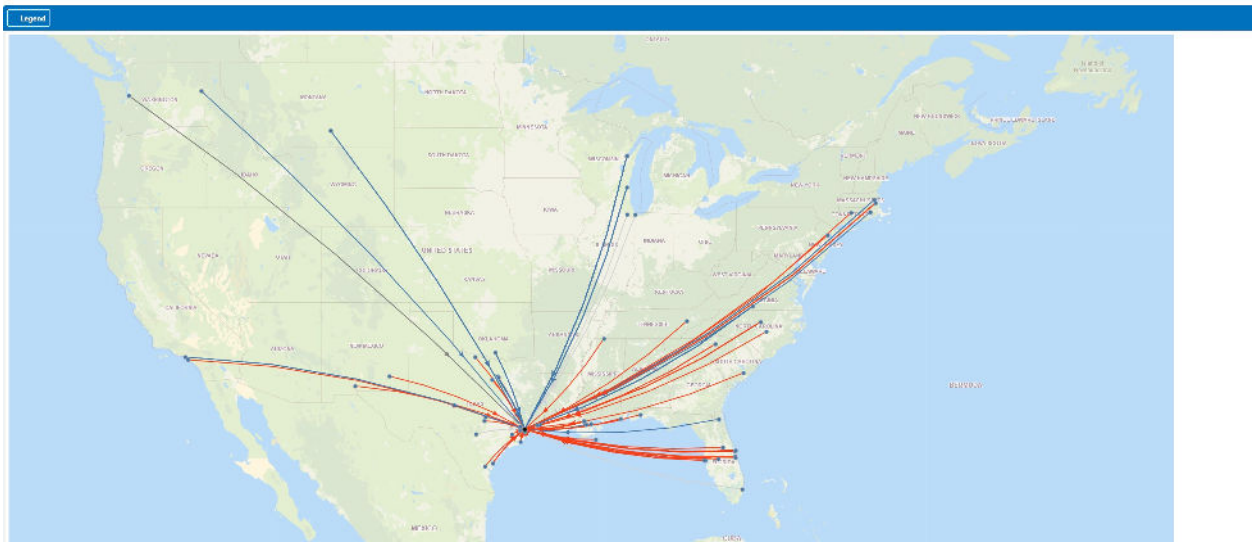


Source: Screenshot PFAS Analytical Tool

The Second Largest Receiver of PFAS Waste, Deer Park, Texas

The second largest receiver of PFAS waste was Deer Park Services in Deer Park, TX a suburb of Houston (3.8 million kg, with 2.9 million kg AFFF and 0.8 million kg of the "six PFAS" - PFOS, PFOA, PFNA, PFHxS, PFBS, or GenX). Deer Park Services' primary listed method of disposal

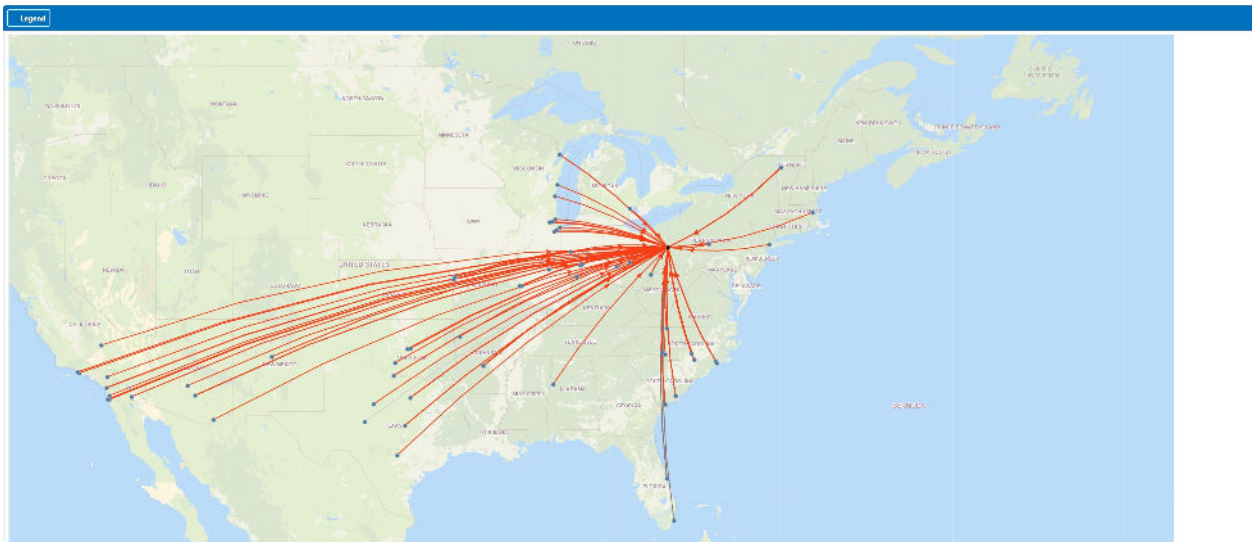
was “Deepwell or underground injection.” No information was included on how this was done or how deep it was injected. Clean Harbors also has a PFAS disposal site in Deer Park, TX (0.4 million kg) that incinerates its PFAS waste.



Source: *Screenshot PFAS Analytical Tool*

The Third Largest Receiver of PFAS Waste, East Liverpool, OH

The third largest receiver of PFAS waste was Heritage Thermal Services in East Liverpool, OH (2.2 million kg, 1.5 million kg “General PFAS” and 0.7 million kg AFFF). The primary method of disposal used at this site was “incineration.” This may result in exposure to airborne PFAS to the surrounding areas, which include East Palestine, OH, where a train derailed on February 3, 2023, and a fire from the burning hazardous materials in that train sent toxic fumes and matter into the surrounding communities.



Source: *Screenshot PFAS Analytical Tool*

EPA opens the Flood Gates to PFAS Waste Imports

Recently, NCNewsLine revealed that the EPA approved the shipment of 4.4 million pounds of PFAS waste from the Chemours Netherlands B.V. facility in Dordrecht to the Chemours Fayetteville Works plant in NC. The approval comes after a 4-year hiatus imposed by the EPA and was apparently done without the notification to North Carolina environmental officials.

After massive pushback from local community groups, EPA announced on November 7, 2023, it was reviewing its previous authorization of these imports.

A large percentage of the shipments from Dordrecht are recoverable HFPO (one of the 6 PFAS slated for EPA regulation and the major component of Gen X). If approved the waste from this process will likely be shipped to Texas for deepwell injection or to East Liverpool for incineration.

Why do these chemicals need to be shipped across the Atlantic Ocean to do this? The answer is because Europe has found it cannot safely manage this process and is beginning to tightly regulate PFAS use, recycling and disposal, so they will ship it to the U.S., where there are few regulations and almost no oversight.

This debacle is another example of why EPA needs to begin immediately setting standards for PFAS waste management and prohibit the importation of PFAS waste. Without the "cradle-to-grave" management of PFAS waste, PFAS contamination will continue to grow, imposing tremendous financial, health, and environmental costs on communities while allowing those who created the problem to avoid or minimize financial responsibility for the harm caused by this waste.

[i] 40 CFR Part 261, Appendix VIII. https://www.epa.gov/newsreleases/epa-responds-new-mexico-governor-and-acts-address-pfas-under-hazardous-waste-law