pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

February 19, 2021

U.S. Environmental Protection Agency
EPA Docket Center, OLEM Docket
Mail Code: 28221T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Interim PFAS Destruction and Disposal Guidance; Notice of Availability for Public Comment
Docket ID No. EPA–HQ–OLEM–2020–0527

To Whom It May Concern:

The Pennsylvania Department of Environmental Protection (DEP) appreciates the opportunity to provide comments on the United States Environmental Protection Agency's (EPA) interim guidance on the destruction and disposal of perfluoroalkyl and polyfluoroalkyl substances (PFAS) and materials containing PFAS.

On December 22, 2020, EPA announced interim guidance on destroying and disposing of certain PFAS and PFAS-containing materials. The new interim guidance outlines the current state of the science on techniques and treatments that may be used to destroy or dispose of PFAS and PFAS-containing materials from non-consumer products, including aqueous film-forming foam (AFFF). AFFF is used as part of fire suppression systems and in emergency responses.

General

PFAS are a group of several thousand synthetic, highly stable compounds produced since the 1940s that are used in a large variety of consumer, commercial, and military applications. EPA issued the interim guidance, not as a rulemaking or policy statement, but to provide current scientific information on disposing of or destroying PFAS and PFAS-containing materials. PFAS are often referred to as "forever chemicals" because they do not break down easily or quickly in the environment. Thus, they present a unique challenge for disposal and destruction. The interim guidance outlines three methods that may be effective and currently available, for disposal or destruction of PFAS and PFAS-containing materials. They include landfill disposal, underground injection disposal, and thermal treatment for destruction (incineration). The interim guidance also discusses the data gaps and challenges of each option, noting the need for further research into these methods for future guidance. EPA intends for this information to inform the decision-making process of those managing the disposal and destruction of PFAS.

EPA included commercial incinerators, cement kilns, and lightweight aggregate kilns in the interim guidance for the destruction of PFAS and PFAS-containing materials. While thermal oxidation and incineration may be the preferred option for disposal, PFAS species are known to effectively promote free radical termination reactions during flame chemistry and may be difficult to combust. In addition, this unique combustion chemistry may promote the formation

of complex products of incomplete combustion (PIC) that may themselves be toxic and/or contribute to ozone depletion as well as other potential physical effects to the atmospheric environment.

Thermal destruction may be an effective means to dispose of PFAS-containing materials, but a significant data gap exists in the identification of operating criteria and the resulting array of PIC. EPA needs to take a more aggressive approach to collect comprehensive data from these thermal destruction processes. Moreover, to assure the public that these thermal destruction processes do not pose any significant adverse impacts, EPA needs to conduct risk assessments using the results from such source tests. Otherwise, acceptance from the public for any incineration of PFAS-containing materials will be difficult.

In this regard, DEP is participating in EPA's Multipurpose Grant Program by undertaking a project that will determine PFAS Destruction and Removal Efficiency (DRE) and determine if PICs are adequately controlled by thermal treatment and post-combustion control. DEP has been in discussion with EPA's Office of Research and Development, the PFAS Innovation Technology Team, EPA Region 3 staff and Measurement Technology Group. They have offered to provide technical assistance with this project and are very interested in offering suggestions and viewing the results. The main goal is to deliver a cleaner, healthier environment by determining if thermal incineration of PFAS is a safe alternative to interim storage, deep well injection, or landfilling. A secondary goal is to identify the pre-combustion PFAS content using a limited subset of PFAS compounds and to identify and determine if PICs are adequately controlled by thermal treatment and post-combustion control. DEP appreciates EPA's participation and grant program.

DEP has permitted hazardous waste combustion technologies and believes they may be suitable methods for destruction of PFAS contamination in wastes. Generally, hazardous waste combustion technologies include commercial incinerators, cement kilns, and lightweight aggregate kilns. These technologies have high combustion temperatures combined with long residence times, which are considered key factors to achieving the highest DREs. Permitted hazardous waste facilities have stringent regulatory controls on temperatures and other important operating parameters, can achieve a 99.99 percent DRE for other (non-PFAS) organic chemicals, and are subject to various federal air regulations. For example, cement kilns combusting hazardous waste are subject to 40 CFR part 63 subpart EEE requirements. This type of facility may be capable of combusting PFAS-containing materials at temperatures approaching 2,000˚ C with a residence time of 8 seconds. If this, or any other technology, can achieve 99.99 percent DRE of PFAS and PIC, this would mitigate deposition and leaching of PFAS into soil and groundwater. DEP believes maximizing residence times (e.g. injecting PFAS at the front of the kiln) will increase the DRE for PFAS compounds with a minimum amount of PIC.

In addition, processing PFAS-containing spent carbon using a reactivation furnace is another possible avenue to achieve a high DRE for PFAS and PIC. For example, a typical spent activated carbon reactivation furnace that is controlled by a cyclone, a thermal oxidizer, a dry

scrubber, and a baghouse may be a viable option for reaching 99.99 percent DRE. A detailed evaluation of this type of furnace is needed for the adequate destruction of PFAS.

Further, DEP recommends additional research to confirm complete destruction of PFAS and PIC in processes with lower combustion temperature and residence times, such as Municipal Waste Combustors (MWC), Hospital/Medical Waste Incinerators (HMIWI) and Sewage Sludge Incinerators (SSI). Typically, MWC operate at a temperature of 1800˚ F and a minimum gas residence time of 1 second with a scrubber, activated carbon, and a fabric filter. SSI operate at a combustion zone temperature of 1700˚ F with gas residence time of 4 or 5 seconds. And, HMIWI operate at a temperature of 1800˚ F and a minimum gas residence time of 2 seconds with a scrubber, activated carbon, and a fabric filter. These types of technologies may be suitable to evaluate PFAS removal efficiency as they are designed to destroy dioxins and furans, which are difficult to destroy. Oxidization of PFAS may result in the formation of hydrogen fluoride, which would require additional control measures for its removal.

As EPA moves toward confirming appropriate PFAS destruction technologies through testing and other scientific process, consideration should be given to creating appropriate guidance for communicating risks to communities, whether air permitting considerations are triggered by either incineration of PFAS and/or its introduction into existing fuels, and what additional reporting mechanisms, if any, should be developed.

The interim guidance also gives consideration to landfilling as a disposal method for the six PFAS-containing waste streams identified in the National Defense Authorization Act (NDAA) for Fiscal Year 2020, and include: AFFF, soil and biosolids, industrial PFAS-treated textiles, spent wastewater treatment residuals, landfill leachate known to contain PFAS, and other industrial wastes from PFAS manufacturing or manufacturing of PFAS-treated goods. The interim guidance identifies landfill leachate as a potential drawback to landfill disposal of PFAS-containing wastes because PFAS can migrate through the waste mass and be carried into the collected leachate. Existing leachate treatment technologies are not adequately effective for removing PFAS that may be in the leachate; thereby, creating a potential for landfills to distribute PFAS into receiving waters.

Most of Pennsylvania's Subtitle D landfills are permitted to accept a combination of both municipal solid waste (MSW) and non-hazardous industrial waste streams, including the six waste streams identified in the NDAA. In Pennsylvania, all Subtitle D landfills are also required to be constructed to Subtitle C standards, including double liners, leachate collection systems, flexible membrane liner caps, and groundwater monitoring. Collected leachate is subsequently treated at a leachate treatment plant (LTP) that is co-located at the landfill. Treated leachate is discharged from the LTP to a receiving water under an NPDES permit. Alternatively, untreated leachate is transported by truck to, or directly connected to, a conveyance with a publicly owned treatment works (POTW). The interim guidance appears to recommend that leachate containing PFAS should not be managed at a POTW, and presumably at an onsite LTP as well. Rather, the interim guidance suggests that PFAS-contaminated leachate should be disposed of using underground injection.

DEP acknowledges that the scope of the interim guidance is limited to the six waste streams identified in the NDAA, and leachate generated by landfills that primarily accept these six waste streams is more likely to contain higher concentrations of PFAS that present the greatest potential for dispersing PFAS into a receiving waters. For said leachate, underground injection may eventually prove to be the only acceptable management solution. However, no such landfill exists in Pennsylvania because Pennsylvania landfills accept a combination of non-hazardous industrial waste and MSW. Given the widespread use of PFAS in consumer goods, it is expected that PFAS is present at varying concentrations in all landfills, including both landfills that primarily receive only MSW and landfills that receive a combination of MSW and non-hazardous industrial waste. Of the landfills that accept a combination of MSW and non-hazardous industrial waste, DEP expects detectable concentrations of PFAS to be present in both those landfills that exclusively accept the six waste streams identified in the NDAA and those that accept other types of non-hazardous industrial wastes that are not identified in the NDAA. It is likely impossible to parse out whether the PFAS in the leachate came from the six sources identified in the NDAA, which form the scope of the interim guidance, or from the widespread use of the compounds in consumer goods that are then disposed of at landfills, which is outside the scope of the interim guidance. Therefore, in practice, the concepts included in the interim guidance are likely to be applied to all landfill leachate and not limited to the six waste streams identified in the NDAA.

Precluding all landfill leachate from treatment at a POTW or by any similar treatment or discharge scenario would create an enormous hurdle for regulated entities and solid waste management organizations, as millions of gallons of leachate are generated daily and would require transportation by truck or rail to an underground injection facility, if treatment and discharge are not feasible. Further, underground injection does not provide a realistic solution given its limited availability, cost, and limited capacity to accommodate a huge new source of liquid wastes from landfills. DEP recommends the development of a discharge limit for PFAS, and additional research to identify treatment technologies that can treat landfill leachate and other PFAS-containing wastewater discharges to an acceptable discharge limit.

Conclusion

DEP believes that use of commercial hazardous waste incinerators, cement kilns, and lightweight aggregate kilns are promising in destroying and disposing of certain PFAS and PFAS-containing material, but more in-depth research is still required.

DEP is eager for EPA to develop air test methods that can identify and quantify air emissions of PFAS compounds from sources. DEP also believes it is imperative to obtain real world test data on PFAS DRE by thermal incineration of PFAS laden material. This would include test data on the destruction of PIC generated during incineration of PFAS-containing materials. Obtaining this information is critical to determine if thermal incineration is viable for the destruction of PFAS-containing materials in Pennsylvania and developing a regulatory plan for how this may be accomplished.

Additionally, DEP believes that the development of a discharge limit and treatment technology to manage PFAS-containing liquid wastes is a critical component of formulating a holistic management strategy for PFAS-containing waste and wastewater, as well as to managing leachate resulting from the historic disposal of PFAS-containing MSW and non-hazardous industrial waste.

DEP appreciates the opportunity to provide comments and technical information for EPA's interim guidance on the destruction and disposal of PFAS and materials containing PFAS. If you have any questions or comments, please contact Krishnan Ramamurthy, Deputy Secretary for the Office of Waste, Air, Radiation and Remediation by e-mail at kramamurth@pa.gov or by telephone at (717) 772-2725.

Sincerely,

Patrick McDonnell
Secretary