Attachment

Sandeep Burman
On Behalf Of The
Association of State and Territorial Solid Waste Management Officials (ASTSWMO)
Responses to Questions for the Record
House Committee on Energy and Commerce
Subcommittee on Environment
Hearing on "Perfluorinated Chemicals in the Environment: An Update on the Response to Contamination and Challenges Presented"
September 6, 2018

1. **Your written testimony discusses the emerging nature of the PFAS chemicals and you point out that until the mid-2000s these chemicals could not be detected in the environment. Can you walk us through why that was and what changed?**
    a. **As the science continues to develop, what will we discover about PFAS contamination and its prevalence?**
    b. **Do States and Territories have a plan to address the more pervasive PFAS contamination?**

a. Although PFAS have been manufactured for more than 50 years, they were not widely documented in environmental samples until the early 2000s. Prior to that, research investigating the environmental fate of halogenated compounds had focused largely on chlorinated and brominated compounds. Fluorinated organic compounds, which include PFAS, had received less attention because their measurement was more difficult. Because they have surface-active properties, fluorinated compounds were more difficult to separate out from the media they were contained in. In addition, because they are nonvolatile and have relatively high molecular weights, they require specialized liquid chromatography/mass spectrometry methods for analysis. Because much of the fluorinated compounds such as PFAS were incorporated into polymers, they were perceived as more biologically inert and therefore, less likely to have an impact on human health or the environment.

However, studies that found some PFAS in the blood of occupationally exposed workers in the 1970s and reported detections in the blood of the general human population in the 1990s led to increased awareness of PFAS in the environment, associated human exposure, and the potential for health effects. This led to the need to sample and analyze for these compounds as well. However, early detection at low reporting limits was hindered due to analytical capability challenges arising from the unique surface-active properties of PFAS. Procedures for detecting and identifying PFAS in the environment required a very high level of technical expertise. Most previously available general analytical methods did not provide enough sensitivity or selectivity. The complex mixture of possible components in a product, the multiple matrices in which they could reside (e.g., the atmosphere, soils, surface water, groundwater, wastewater, different animal tissues, different animal species, plant species, foods, etc.), and trace level detection required selective extraction and diverse analytical techniques. Reliable quantitative methods for compound-specific extraction, separation and identification were developed only during the late 1990s to early 2000s. Prior to that, only relatively insensitive and non-specific analytical methods such as total organic fluoride were

available. This lack of a practical PFAS compound-specific method of analysis that could be applied to a wide range of sample types with sufficient sensitivity to measure ecologically relevant concentrations of specific compounds was not overcome until the early 2000s. This was when development of compound-specific methods for the analysis of some PFAS using high-performance liquid chromatography finally took place.

b. As States conduct additional sampling in response to the continually evolving understanding of PFAS sources and transport pathways, and as methods for sampling and testing get better, more releases and impacts will be discovered. For example, recent investigations by a number of States have found PFAS contamination at landfills, metal plating facilities, schools and car washes. These releases will be from both historical and current sources. More PFAS compounds will therefore be discovered at new locations, and in new media that will pose added human health and ecological exposure pathways. The extent and magnitude of known releases will grow larger as more compounds are detected in the release 'mixture' and the resultant contamination will be found to extend to even greater distances from the source. The problem is therefore likely going to assume even greater magnitude and even more serious implications for public health and the environment. If a cohesive national strategy is not in place, public concerns about a multitude of exposure sources including drinking water, fish, agricultural products, and consumer goods to name just a few will reach a level that will be difficult to address. The risk communication challenge in regards to PFAS are therefore bound to assume very serious proportions.

   The Interstate Technology Regulatory Council (ITRC) estimates there are over three thousand compounds belonging to the PFAS family, while other sources such as the U.S. Environmental Protection Agency (EPA) place this number higher, with estimates ranging from five thousand to ten thousand. The single analytical method currently approved by EPA only detects fourteen of these compounds. Some States have developed analytical methods to detect an additional ten to twelve PFAS in the environment. There are federal drinking water guidance values for just two of these compounds, and various forms of State standards for an additional six to eight compounds. Given the prevailing uncertainties and variability across the country, and the absence of a unified comprehensive national strategy, State resources are stretched thin just dealing with this relatively small sub-set of PFAS that are currently driving response actions. States will likely be overwhelmed as additional PFAS compounds from this vast group are established as being confirmed risk drivers. The plans, tactics and strategies that the States are employing to respond to the current set of PFAS of concern and the resources at their disposal will not be able to cope with an influx of a large number of additional compounds that will need to sampled, analyzed and treated for in various media. There is urgent need for the development and deployment of a unified national plan to address the imminent increase in the pervasiveness of PFAS contamination.

2. **What steps has the Association of State and Territorial Solid Waste Management Officials taken to coordinate efforts among the States and Territories and coordinate efforts with EPA and local governments regarding the issues associated with the PFAS chemicals?**

   ASTSWMO has designated supporting the efforts of the members and providing resources for them in responding to PFAS a top priority. ASTSWMO has therefore been expending significant effort since the emergence of PFAS as an issue. The major activities undertaken by ASTSWMO include:

   a. Advocating for State and Territorial input and participation in federal efforts pertaining to PFAS.
   b. Participating in multiple national policy and technical efforts related to PFAS on behalf of the States and Territories.
   c. Maintaining a digital platform for rapid sharing of all PFAS related national news with the States and Territories.
   d. Providing a forum through which the States and Territories can request PFAS information and assistance from each other.
   e. Including PFAS as a standing topic at all ASTSWMO meetings for the past few years, providing the membership information, and training on PFAS from national experts.
   f. Collaborating on PFAS work with other national level State media (water, air, drinking water, public health, etc.) organizations to ensure multidisciplinary and multi-jurisdiction knowledge sharing and joint policy and technology development.
   g. Other steps to promote education and information sharing amongst the ASTSWMO members on PFAS.

3. **Is EPA doing enough to coordinate with States and Territories on the PFAS issue?**
   a. **Is EPA providing sufficient support to the States and Territories with respect to the PFAS issue?**

   EPA provides updates on its PFAS efforts, principally aligned along the four-pronged approach announced at the National PFAS Summit of May 2018, through a dedicated website. EPA also participates in various State meetings to provide updates. EPA has also conducted several community meetings across the country. However, completion of the four action items announced at the National Summit are still pending and the States have had varying degrees of opportunity to provide input on them, ranging from periodic to very limited. There are multiple EPA offices involved in the various aspects of PFAS work and the interrelationships and collaboration are not always apparent. The implications of the draft Agency for Toxic Substances and Disease Registry (ATSDR) toxicological report on certain PFAS (including PFOA and PFOS) that were released under somewhat controversial circumstances are also not clear. The ATSDR draft report suggests that stricter guidelines for human exposure to PFAS should be considered. The ATSDR's report also suggests that human health risks may occur at levels significantly lower than the current federal recommendations. Some of the report's findings therefore appear to contrast to those of the 2016 EPA health advisory for PFOA and PFOS of 70 ppt. There has not been much discussion offered by EPA on this issue, which remains a source of confusion and concern to the States and communities seeking to establish credible protective standards for PFAS.

   a. EPA has provided limited on-the-ground assistance to actual PFAS responses in a few States. This appears to vary amongst the EPA regions, and there has been no clear definition of what

role EPA can play and what assistance it can provide at actual PFAS response actions. At present there do not appear to be any clear rules for engagement for EPA to provide assistance at PFAS response actions in States, or a defined process for States to request assistance. PFAS issues brought to EPA's attention appear to be handled on a case-by-case basis, which does pose some challenges for the States for planning and communication purposes.

4. **Your written testimony notes that "States are also unclear on how responsible parties can be required to remediate PFAS contamination."**
    a. **Why is that?**
    b. **Are the parties responsible for PFAS contamination meaningfully addressing the cleanup of the contamination?**

a. PFAS are not listed as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances. PFAS are also not currently regulated under the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), nor the Clean Air Act (CAA). States rely on the clear and unambiguous statutory characterization of contaminants of concern as hazardous substances or hazardous wastes in order to identify potential responsible parties (PRPs), and then be able to require complete and timely response actions. Many States have their own 'Superfund' laws and programs to supplement CERCLA, but those are based on, and in many cases derive their authority from, the same legal foundations and operational steps as the federal statute and program. The lack of inclusion of PFAS in the federal program thereby also hampers their coverage under the state programs when it comes to the implementation of PRP processes including cost recovery. At the National PFAS Summit of May 2018, States stressed how critical it was for EPA to move forward with listing PFAS as hazardous substances under CERCLA.
b. In the absence of a clear regulatory framework, responsible parties for PFAS contamination are sometimes unwilling to take the necessary steps or protracted negotiations are needed to reach an agreement under which response actions can even start. The subsequent progress and outcomes of response actions conducted under such case-specific agreements reached outside of CERCLA can be incremental and not as consistent and comprehensive as those that are conducted under a statutory requirement, which can provide for standardized and transparent cleanup goals and paths to accomplish those. Site progress and cleanup goals under site-specific agreements often have to be renegotiated as the PRPs obtain additional information and the site conceptual model becomes clear. This is in contrast to remedial actions conducted under CERCLA authority. The CERCLA statute requires that Superfund response actions ensure protectiveness of human health and the environment, and comply with both state and federal laws and regulations that constitute "applicable or relevant and appropriate requirements" (ARARs).

5. **Your written testimony points out that EPA should treat the multiple PFAS chemicals as a class or mixture of chemicals in order to designate them as hazardous substances under CERCLA and hazardous waste under RCRA.**
    a. **Why is this important?**
    b. **Can you walk us through what this means?**

    a. We now know there may be several thousand chemicals in the class known as PFAS. However, most of the investigative and regulatory attention is still focused on the veritable tip of the iceberg – primarily PFOA and PFOS, and more recently a few other PFAS. It is clear, though, that in most cases, PFAS are present as complex mixtures and therefore States have to try to address an ever-increasing list of PFAS. There are federal standards for only two compounds and States have developed standards for about six to eight additional PFAS. Meanwhile, site investigations typically employ target analyte lists of over twenty PFAS. Advances in analytical chemistry are allowing the detection of even more of the precursor compounds that may degrade to form PFAS of concern. Therefore, it is clear that our understanding of the ecological and human health risks associated with these chemicals lags far behind our ability to detect them. Debates continue over the health-based values for PFOS and PFOA; there is no national agreement on standards for even these two best known, and most studied PFAS. This prevailing situation of slow progress on setting standards, and the uncertainty and variability that exists even when standards are set, appears to be how things will be for the near future. Therefore, developing standards for individual PFAS one at a time will do nothing to alleviate this situation. For instance, it will not be possible to develop a credible cleanup goal for impacted drinking water supplies based on standards for just one or two of the several PFAS compounds that are being detected in the water.

    b. It is therefore necessary that alternate and innovative approaches be taken to achieve some meaningful progress in public health protection and risk communication. Individual States are beginning to take steps to address the issue of drinking water being contaminated by a mixture of PFAS. States are trying to close this gap between the number of PFAS being detected and those with standards established, but this is leading to questions about consistency as well. For instance, Massachusetts requires that public drinking water cannot have more than 70 ppt total either individually or in combination for a combination of five PFAS compounds: PFOA, PFOS, PFHxS, PFNA, and PFHpA. Vermont recommends that the sum of the same five compounds under the Massachusetts guidance values (PFOA, PFOS, PFHxS, PFHpA and PFNA) not exceed 20 ppt individually or in combination in drinking water. Minnesota uses a hazard index rating based on five PFAS (PFOA, PFOS, PFBA, PFBS, and PFHxS) to regulate drinking water safety. States are therefore doing their best to deal with the occurrence of PFAS as mixtures but the ultimate solution probably lies with EPA dealing with PFAS as a class as opposed to focusing on them individually as has been the approach so far. There may be scientific challenges to doing so but the issue merits serious consideration from EPA. Variants of the concept such as grouping PFAS into sub-classes of compounds that have similar structures, properties and toxicity may also be possible upon closer study. Bringing PFAS as a class, or a group of related sub-classes, under CERCLA and RCRA coverage would eliminate much of the technical and regulatory uncertainties caused by the fact that these compounds are detected as complex mixtures and not as individual chemicals. CERCLA does not contain any chemical-specific cleanup standards. However, the CERCLA statute requires, among other things, that Superfund response actions ensure protectiveness of human health and the environment, and comply with federal laws and regulations that constitute ARARs.

CERCLA provides for the timely identification by the States of potential ARARs and to-be-considered values (TBCs). Risk-based goals may be calculated and used to determine cleanup levels when chemical-specific ARARs are not available or are determined not to be sufficiently protective. All of these provisions would be available to States and EPA for dealing with various combinations of PFAS mixtures if these compounds could be broadly listed as CERCLA hazardous substances. Even if universal national standards – such as Maximum Contaminant Levels (MCLs) for drinking water – take some time to develop, the ability to treat PFAS as a class under a unified regulatory framework such as CERCLA will place a variety of tools at the disposal of the States that they lack now. This will lead to significant optimization of both PFAS response action and effectiveness of the attendant risk communications.

6. **Your written testimony states that national collaboration on the issue of PFAS contamination is critically needed.**
    a. **What are the biggest challenges facing the State and Territories with respect to the PFAS issue?**
    b. **Can you walk us through what ASTSWMO is doing currently and what you think needs to be done in the future?**

a. ASTSWMO members have repeatedly expressed their greatest needs in terms of addressing PFAS as being:
    i. A consistent national regulatory framework for addressing the investigation and cleanup of PFAS contamination. This could for instance be accomplished by listing PFAS as hazardous substances under CERCLA. Listing as a hazardous waste under RCRA in addition to as hazardous substances under CERCLA would also offer the added benefits of (a) PFAS remediation wastes being managed appropriately, and (b) opening up more cleanup authorities.
    ii. Clear and consistent regulatory standards for protecting public health and ecological receptors. Standards are needed in particular for drinking water and groundwater, soils and surface waters. Promulgating MCLS for PFAS would be one critical example of such a universal national standard.
    iii. Developing analytical methods/sampling protocols for PFAS in various media and promoting the attendant certified laboratory capacity.
    iv. Risk communication assistance with impacted communities and citizens in general as awareness and concern about PFAS increases. The uncertainties and variabilities when it comes to how PFAS is being addressed across the country pose unique risk communication challenges.
    v. Developing and pilot testing innovative and cost effective remedial technologies for soil and water contaminated by PFAS.
    vi. Research on toxicity of PFAS as well as fate and transport of these compounds in the environment.

b. ASTSWMO's ongoing efforts to assist the members with all of the above were listed previously in response to Question 2. In addition to those actions, ASTSWMO feels additional activities that would be of great value to the members include conducting additional trainings through webinars and conducting peer matches between members. While the status of the Association's resources has not permitted significant activity under each of these initiatives, ASTSWMO continues to seek opportunities to conduct both webinars and peer matches. Both

efforts would help members learn from each other and from other experts and help them optimize and enhance PFAS responses.

7. What do you think the Department of Defense should be doing to address PFAS contamination?

The Department of Defense's (DoD's) military departments should continue to investigate the full extent and magnitude of PFAS contamination associated with their current and former installations. PFAS should be investigated in all media, and done so with the purpose of ensuring that public health and environmental risks are addressed both on and outside the present or former facility. DoD should be nimble and flexible in their process and proceed at a pace that is commensurate with the risks posed by PFAS and the concerns and needs of the community. DoD should take into consideration any State and local standards that exist for various PFAS, beyond just the EPA advisories for PFOS and PFOA. DoD should actively participate with State and local authorities to conduct timely and transparent risk communication with impacted communities.

At present, it appears that DoD will provide treatment or alternative water only when PFOA/PFOS is detected above a health advisory limit. DoD does not appear to be taking any proactive steps to prevent water systems from becoming impacted by existing contamination, including preventing contamination that is migrating towards a production well from impacting that well. DoD's rationale appears to be that no action is needed, as there are no PFAS cleanup standards for ground water and surface water. This ends up placing a lot of burden on the water systems to test and manage their water for contaminants when the water system is not responsible for the contamination. In essence, the water systems have to act as potential responsible parties. DoD therefore needs to reimburse States for costs incurred to respond in any way to PFAS contamination coming from their installations.

DoD also should proactively take steps to implement best management practices for existing stocks of PFAS containing firefighting foams to eliminate releases to the environment. DoD should also be aggressively pursuing the development and deployment of PFAS-free firefighting foams.

8. It appears that detection applies to plumes of contamination spreading from sites, and has led to concerns that problem is getting worse? Is it getting worse or are we just now seeing what we did not see before?

PFAS releases are still occurring into the environment from active sources such as industrial sites, landfills, wastewater treatment plants, and firefighting foam applications. As our knowledge of PFAS fate and transport increases and our sampling and analysis capabilities improve, we will detect these ongoing releases and be able to better define their full extent and magnitude. This will undoubtedly add to the growing inventory of known and documented PFAS releases that pose risks to public health and the environment.

The progression of known risks from historic PFAS releases is somewhat different as compared to the situation stated above for ongoing releases. Many historic release source areas and offsite extents – such as contaminated groundwater plumes – have only been sampled for and therefore defined using the handful of PFAS, about six to eight compounds that have federal or state standards of some type assigned to them. At best, they may be defined by the fourteen compounds that are in the current EPA approved method for drinking water – Method 537. Some of the most widespread and mobile PFAS are not included in the EPA list. When these are

eventually added, plumes that were defined by the old list will now appear to grow when they are sampled using the updated list. Moreover, the potential for adding more PFAS compounds to the analyte list for defining groundwater plumes will always be significant given the vast universe of these compounds. As additional analytes are sampled for and detected at lower and lower limits, the apparent boundaries and impacts from known PFAS groundwater plumes have the potential to grow exponentially.

9. Would you describe how states work with DOD to detect PFAS?

a. How do you work with EPA to ensure you are using the most appropriate assessment technologies?

DoD's position is that it is conducting PFAS response actions under the Defense Environmental Restoration Program (DERP), which provides authorities to DoD to perform and fund these actions, and requires they be carried out in accordance with CERCLA. According to DoD, its first step was to identify the source of a known or suspected release. DoD has identified 401 active and former installations with known or suspected release of PFOS or PFOA. The DoD also states that it has proactively taken action to address drinking water impacted by DoD releases. DoD reports that it bases these actions on the EPA advisories for PFOS and PFOA even though these are non-regulatory guidance under the Safe Drinking Water Act and not required or enforceable drinking water standards. DoD reports that though not required by law or regulation, it has followed the EPA health advisories for PFOS and PFOA, and provided consumers bottled water or additional water treatment.

Once PFOS and PFOA impacts to drinking water have been addressed, DoD states that the military departments are prioritizing sites for further actions using the normal CERCLA risk-based process. As DoD moves through the CERCLA process it applies to PFAS sites, the Department works in collaboration with regulatory agencies and communities to share information and gather input. DoD limits its response actions for PFAS contaminated drinking water to situations where there are exceedances of the EPA advisories for PFOS and PFOA. This sometimes creates complexities for the State and local authorities when additional PFAS are detected above State standards and where there is a State standard for PFOS and PFOA that is lower than the EPA advisories. While DoD voluntarily uses elements of the CERCLA process for investigations, the States do not have access to the standard CERCLA regulatory authorities as PFAS sites are not in the Superfund Program. The States therefore continue to collaborate with DoD through a diversity of situations with the objective of ensuring immediate risks are addressed on the way to complete site investigations and risk assessments that will result in full and final cleanups. There is not always perfect alignment or full agreement between States and DoD, but the work and dialogue continue in a generally collaborative manner, with the anticipation that development of a consistent national framework will bring clarity to these situations as well.

a. EPA work on PFAS, including efforts to coordinate with the States, is covered in the response to Question 3. Specifically on assessment methods, EPA has developed a laboratory method for measuring PFOS, PFOA and twelve other PFAS in drinking water (EPA Method 537). EPA has stated that it is working on publishing an expanded version of the current drinking water Method 537 to include GenX chemicals and additional PFAS. EPA has stated that this update method will be published in 2018.

10. For site remediation, what are the available methods that may be deployed?

a. What is the Federal government doing to ensure communities have sufficient information to assess the public health benefits against the cost for deploying these systems?

According to the ITRC, only a few conventional methods and technologies are in widespread use at present for remediation of PFAS in both soil and water. Other newer and innovative technologies are at various stages of development and testing, but are not known to be in common use at present.

A. Soil
    i. In use:
        1. Capping
        2. Excavation and disposal
    ii. Under development:
        1. Sorption and stabilization
        2. Thermal treatment
B. Water
    i. In use:
        1. Granular activated carbon (GAC)
        2. Ion exchange
    ii. Under development:
        1. Biochar
        2. Precipitation/flocculation/coagulation
        3. Redox technologies
        4. Reverse osmosis
        5. Nanofiltration

a. EPA has compiled an online resource for PFAS that includes topics such as policy and guidance, chemistry and behavior, occurrence, toxicology, site characterization, and remediation technologies. EPA continues to update its 'Drinking Water Treatability Database' with information on PFAS compounds as information becomes available.