

Issue No. 9 | Summer 2018 Is It a REC? – Emerging Contaminants Part 1 - PFAS

Whenever the U.S. Environmental Protection Agency refers to a class of chemicals as a “national priority,” then is it safe to assume that occurrences of those chemicals also should be considered a Recognized Environmental Condition (REC) when performing a Phase I environmental site assessment? The answer is still emerging.

EPA Administrator Scott Pruitt made the national priority reference when he addressed attendees of an invitation-only EPA Forum held on May 22, 2018 that was billed as a “National Leadership Summit” on per- and polyfluoroalkyl substances, or “PFAS.” The Forum added more attention to this class of chemicals that have turned up as environmental contaminants following widespread use in firefighting foams, upholstery, paper packaging, and non-stick industrial and consumer product application. Pruitt went so far as to state that EPA will move forward to declare PFAS and related chemicals as hazardous substances under Superfund cleanup laws and will evaluate setting a Maximum Contaminant Level (MCL) for drinking water. These emerging contaminants are not specifically addressed in the American Society for Testing and Materials E1527-13 Standard Practice for Environmental Site Assessments, nor does EPA offer a clear time line or pathway for additional regulation. However, the attention given to PFAS is clearly building. Environmental Professionals should carefully evaluate these chemicals when conducting ESAs, and provide relevant information to the user that will allow an informed decision when considering present and potential future environmental risk on a subject property.

What are PFAS and why are they important?

PFAS are a complex family of more than 3,000 manmade fluorinated organic chemicals (EPA et al.) that include both per- and polyfluorinated versions. Perfluorinated chemicals, such as perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS), are a subset of PFAS with long carbon chain atoms that are totally fluorinated, while polyfluorinated chemicals have at least one carbon chain atom that is not totally fluorinated. Due to unique physical and chemical properties, PFAS have been manufactured and used worldwide as surfactants or oil and water repellants. Similar in some ways to polychlorinated biphenyls (PCBs), some PFAS are environmentally stable, mobile, persistent, and bioaccumulative. This contributes directly to the concern for more regulations, since PFAS have been detected worldwide in human blood, sediments, surface and groundwater, and wildlife.

According to the Interstate Technology Research Council (ITRC), **Emerging Contaminants**, or Contaminants of Emerging Concern (CECs) are those chemicals that present known or potentially unacceptable human health effects or environmental risks, and currently (1) do not have regulatory cleanup standards, or (2) regulatory standards are evolving due to new science, detection capabilities, or pathways; or both.

PFAS compounds were produced beginning in the 1940s. Below are examples of some of the more well-known PFAS and in which products they are contained, useful for consideration when conducting ESAs and file reviews at potential source areas. Such areas may include manufacturing facilities, industrial users, fire/crash training areas, and waste sites where PFAS products have been disposed. Disposal sites affected by PFAS may include landfills and their leachate as well as wastewater and biosolids from both industrial and municipal wastewater treatment.

- **PTFE (Polytetrafluoroethylene)** – non stick coatings and waterproofing for fabrics, perhaps best known as Teflon™, discovered by DuPont Co. (now Chemours) in 1938 and widely applied as a non-stick coating in cookware and a host of industrial uses. Releases to the environment for these and other PFAS have included discharge to wastewater, air emissions that are dispersed and re-deposited via rain water, and direct ingestion from consumer products.
- **PFOS (Perfluorooctane Sulfonate) and PFOA (Perfluorooctanoic Acid)** - used in many industries including carpet and clothing treatments; coatings for paper packaging and leather; industrial surfactants, emulsifiers, wetting agents, additives and coatings; fire and chemical resistant items.
- **(AFFF) Aqueous Film Forming Foam (AFFF)** - complex mixtures of PFAS used as fire-fighting foam in extinguishers or applied directly for fire suppression and fire training at military bases and civilian airports, resulting in contaminated runoff to soils, storm water, groundwater and surface water.
- **PFNA (Perfluorononanoic acid)** – like PFOS and PFOA, except having an extra carbon which makes this compound more bioaccumulative and toxic, PFNAs have been used in architectural resins and other products.

- **GenX** – Due to concerns of their toxicity, manufacturers began phasing out production of some fluoropolymers and switched to alternative compounds that retain the desired chemical and physical properties but have fewer carbon atoms than the eight-carbon molecules seen in legacy “long chain” PFOA and PFOS. Among these is GenX, developed by Chemours in 2008. However, after industrial releases of GenX compounds impacted a major drinking water source, there is new controversy over the potential health effects of these replacement “short chain” PFAS. Another short chain compound being studied for its health effects is **PFBS (Perfluorobutanesulfonic acid)**, a four-carbon substitute for PFOS made by 3M Company.
- **Other** – PFAS include a wide range of other substances that vary in their chemical and physical properties and have complex naming conventions that can cause confusion. A good reference that summarizes the names and physical/chemical properties of the families of PFAS, as well as other technical resources for addressing environmental fate is available from ITRC [here](#). Also, the *DRAFT Toxicological Profile for Perfluoroalkyls*, was published for public comment in June 2018 by the Agency for Toxic Substances and Disease Registry (ATSDR), available [here](#).

Regulatory Guidance is Still Emerging

Toxic Substances Control Act (TSCA) – As the TSCA is EPA’s primary authority for reporting, record-keeping, and testing of chemicals and chemical mixtures that may pose a risk to human health or the environment, it would follow that PFAS have been regulated under TSCA as new uses are proposed. This may aid an environmental assessor in seeking out relevant regulations in a particular industry or facility that has manufactured, used, or disposed of PFAS.

Safe Drinking Water Act – The SDWA is the federal law that allows EPA to set enforceable MCLs for chemicals in drinking water. EPA has not yet established MCLs for any PFAS, only a health advisory for PFOA and PFOS in drinking water of 0.07 micrograms per liter (70 parts per trillion). If EPA Administrator Pruitt’s National Leadership Summit announcement is any indication, MCLs for PFAS may be coming in the near future.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - PFAS, including PFOA and PFOS, are not listed as CERCLA hazardous substances but may be addressed as CERCLA pollutants or contaminants. For example, CERCLA investigations are beginning to include PFAS at relevant sites and PFAS have been reported for 14 CERCLA sites during 5-year reviews (USEPA). It is therefore possible that the attention given PFAS at the Superfund level may eventually trickle down to brownfields programs and environmental site assessments performed using All Appropriate Inquiries.

State Regulations – Not content to simply wait for Federal guidance, several states have been actively involved with addressing PFAS contamination. PFOS and PFOA compounds are considered for further regulation in California that, among other requirements, will prohibit discharge of these PFAS to drinking water sources. Regulations that require reporting of PFOS in children’s products, and that identify some PFAS as hazardous substances or hazardous wastes are being considered or are already on the books in some states.

How to address PFAs in ESAs is clearly an emerging topic that is worthy of continued attention. Look for our *Emerging Contaminants Part 2* in Fall 2018, which will examine other chemicals including 1,4-Dioxane, perchlorate, and a wide class of compounds that includes pharmaceuticals and referred to as endocrine disrupting chemical (EDCs).

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