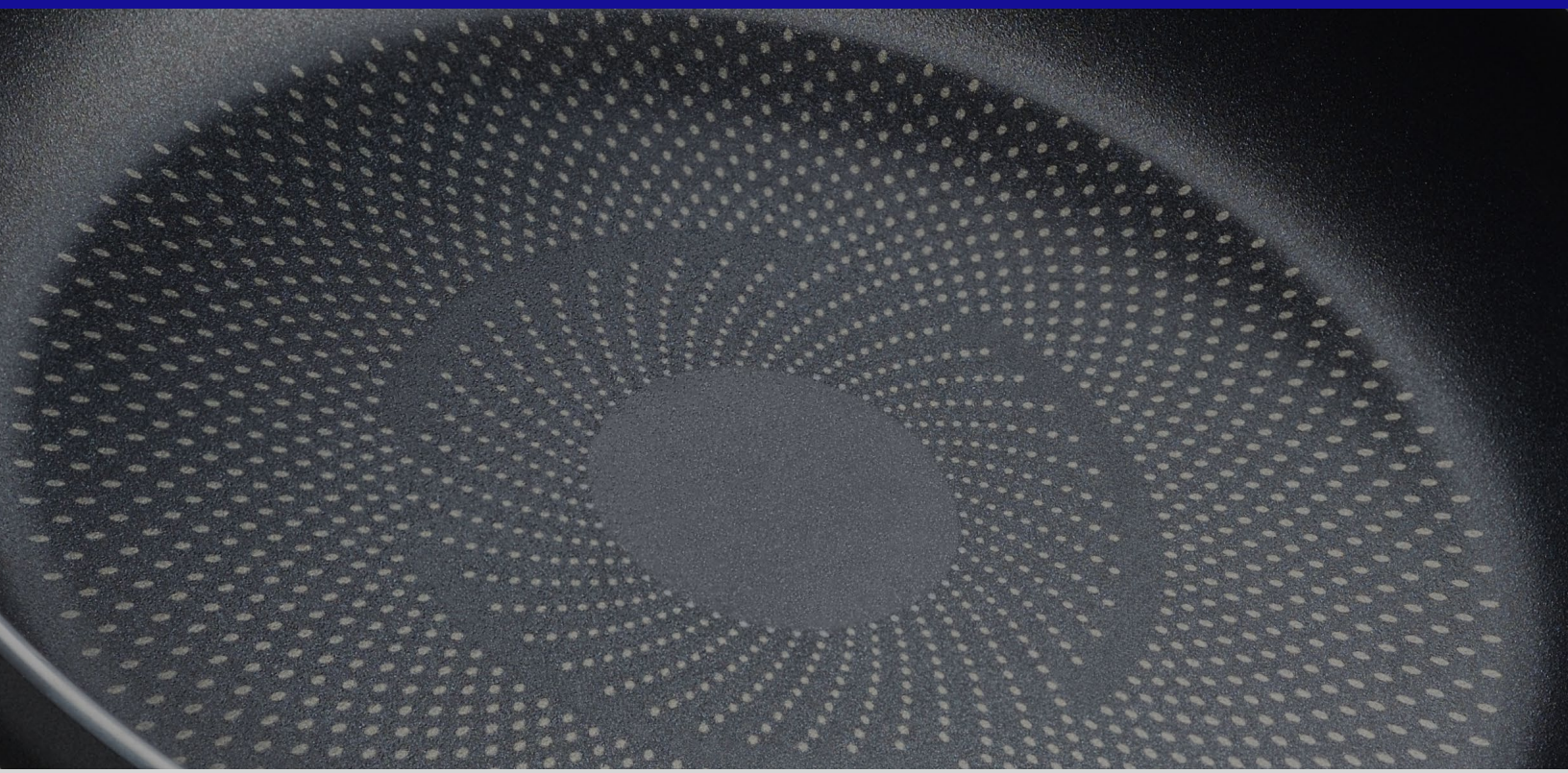
CHUBB

Recognizing the Risk of Per- and Polyfluoroalkyl Substances (PFAS) in the Environment

By: Ruth Weinberger, Senior Consultant, and
Amy Couch Schultz, Assistant Vice President, Chubb Global Risk Advisors



Chubb Global Risk Advisors

Per- and polyfluoroalkyl substances (PFAS) are a broad class of man-made chemicals that have been manufactured and widely used since the 1940s in various industrial and commercial applications, in part due to their unique surfactant properties. Their value in coatings and surface protectant formulations is due to their water- and oil-repelling nature, as well as their resistance to heat, chemical agents, and stains.

Initially designated as emerging contaminants, PFAS are currently recognized as significant chemicals of concern in the U.S. owing to their potential for serious risks to human health and the environment, and their limited degradation once present in soil and groundwater. PFAS continue to be under aggressive federal and state regulatory scrutiny, with activities underway to establish enforceable standards and remediation guidelines, and to regulate the manufacture, sale, and use of PFAS.

To date, the U.S. Environmental Protection Agency (USEPA) has identified over 12,000 chemicals that are considered to be PFAS.

What are PFAS?

PFAS are a group of literally thousands of man-made chemicals, including two well-known chemicals, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), and many others. The actual number of PFAS known to exist has increased over the last several years as knowledge of the manufacture of these chemicals, including customized PFAS synthesis for specific companies and industries, has increased. To date, the U.S. Environmental Protection Agency (USEPA) has identified over 12,000 chemicals that are considered to be PFAS. Various PFAS are persistent in the environment and in the human body, which means they do not break down and can accumulate over time. ***Exposure to PFAS may result in adverse human health effects, which are discussed later in this article.***

PFOA, one of the more widely-studied PFAS, was used in the production of the chemical polytetrafluoroethylene (PTFE), best known by the commercial name Teflon™. This chemical was first synthesized in 1938 by DuPont and came into widespread use in the 1960s. Most manufacturers ceased the use of PFOA in cookware around 2002; however, Teflon™ and other non-stick cookware using PFOA were not officially phased out of production in the U.S. until 2014. PFOA has been used in the manufacture of various products, including non-stick and stain-resistant coatings, waterproof textiles, electrical wire casing, and fire-fighting foams, as well as a surfactant in various industrial processes.

PFOS, another widely-studied PFAS, has also been used in the production of various industrial and household items since the 1940s. One of the most well-known products that contained PFOS was 3M's line of Scotchgard™ stain repellants; however, PFOS was reported to have been phased out of the manufacture of this product line in 2002. PFOS also has been used in pesticides, surface coatings for carpets, upholstered furniture, leather products, waterproof apparel, food packaging, and paper goods. Additionally, PFOS has been used in aqueous film forming foam (AFFF), which was developed in the late 1960s to extinguish petroleum and flammable liquid fires. PFOS has also been utilized as a surfactant in industrial processes and as mist suppressants added to metal plating and finishing baths. As with PFOA, PFOS may still be present in some products imported into the U.S. today.

What Sources Present a Concern for PFAS?

Some production and manufacturing facilities where PFAS may be of concern, as well as their associated Standard Industrial Classification (SIC) codes, include:

Production and Manufacturing Sources	SIC Codes
PFAS Chemical Manufacturing	2800, 5169
Textile & Leather Manufacturing (including coatings)	2200, 2300, 3100
Paper Products (including grease- and moisture-resistant coatings, packaging)	2600
Chrome Metal Plating & Etching (including wetting agents, fume suppressants)	3300, 3400, 3500
Other Metal Plating (including copper, nickel, tin electroplating and post-plating cleaning)	3300, 3400, 3500
Wire Manufacturing (including coating and insulation wires)	3600
Paints & Coatings (including associated additives)	3200, 3300, 3400

Some non-manufacturing sources of PFAS which may be of concern, as well as associated SIC Codes, include:

Production and Manufacturing Sources	SIC Codes
Fire Suppression Systems (e.g., flammable liquid storage, water-sensitive materials storage, electronics manufacturing, ocean-going vessels, airports)	1300, 2800, 2900, 3000, 4000, 4200, 4400, 4500, 4600, 4700, 4900, 5169, 5171, 5172, 5983, 5984, 5989
Biosolids Generated in Wastewater Treatment Plant Operations	4900, 9100
Agricultural Fields & Properties with Biosolid Application	01, 0191
Consumer & Other Products	2800, 2844
Landfills (due to the acceptance of PFAS-containing wastes)	9100

Due to the solubility and persistence of many PFAS, environmental release mechanisms associated with these facilities include air emission and dispersion, spills, and disposal of manufacturing wastes and wastewater.

PFAS are mobile in air, soil, sediment, biota, surface water, and groundwater. These chemicals can leach from soils into groundwater or can be dispersed by air and travel long distances away from the source.

What is the Potential for Environmental Impact from PFAS?

As noted previously, PFAS contamination may come from a wide range of sources. One direct source of release to the environment for these chemicals is landfills, where certain types of refuse can break down and cause PFAS to leach into soil and groundwater. Other, more indirect, sources can impact the environment when precursor chemicals break down to form PFOA and PFOS. The USEPA has concluded that, once present, both PFOA and PFOS are persistent in both the environment and in the human body.[1] Due to their prevalence in the environment, PFAS also have been found in plants, such as lettuce, spinach, and strawberries, and in a variety of terrestrial and aquatic animals.

According to a fact sheet published by the Interstate Technology Regulatory Council (ITRC) in 2022,[2] PFAS are mobile in air, soil, sediment, biota, surface water, and groundwater. These chemicals can leach from soils into groundwater or can be dispersed by air and travel long distances away from the source. PFAS have been found in landfills, wastewater treatment plants, biosolids and farm fields, and even in remote areas, including the ocean and polar regions.

According to a 2016 fact sheet published by the USEPA,[3] PFAS has contaminated drinking water in the U.S., and these chemicals can cause adverse health effects when humans (and animals) are exposed to them. In 2023, the USEPA announced that $2 billion is available from the Bipartisan Infrastructure Law[4] to address emerging contaminants, such as PFAS, in drinking water across the U.S. According to a January 2021 article by Scientific American,[5] two researchers gathered information from various sources, including federal and state agencies, and were able to estimate that more than 200 million people in the U.S. have tap water contaminated with PFAS, specifically a mixture of PFOA and PFOS, at concentrations of one part per trillion (ppt) or higher.

What About Exposure to PFAS?

Humans are exposed to PFAS from many sources, including food (both homegrown and store-bought), food packaging, drinking water, and consumer products. On March 9, 2023, the National Institute of Environmental Health Sciences (NIEHS) published an article,[6] which indicated that a report by the Centers for Disease Control and Prevention, using data from the National Health and Nutrition Examination Survey (NHANES), found PFAS in the blood of 97% of the U.S. population. Some evidence suggests that even very low levels of PFAS exposure may not be completely safe for human health.

A study published in Toxicology in October 2020[7] considers PFAS to be common drinking water contaminants of concern due to mounting evidence implicating adverse health outcomes associated with exposure, including reduced kidney function, metabolic syndrome, thyroid disruption, and adverse pregnancy outcomes. Human exposure to PFAS has also been associated with potential adverse effects on the immune, endocrine, metabolic, and reproductive systems (including fertility and pregnancy outcomes), and an increased risk for cancer.

The World Health Organization's cancer research arm, the International Agency for Research on Cancer (IARC), currently classifies PFOA as a Group 2B carcinogen, or "possibly carcinogenic to humans."

In a Technical Fact Sheet published in 2022,[8] the USEPA suggests there is evidence that PFOA is likely to be carcinogenic to humans and that there is suggestive evidence of carcinogenicity of PFOS. Highly exposed humans were observed to have correlating increases in testicular and kidney cancer. Additional analyses of cancer study data are ongoing for both PFOA and PFOS.

How are PFAS Regulated?

On October 18, 2021, Administrator Michael Regan announced the USEPA's PFAS Strategic Roadmap,[9] which was described as a "whole-of-agency approach to addressing PFAS." This roadmap includes timelines by which the USEPA plans to take actions and commit to new policies intended to safeguard public health, protect the environment, and hold polluters accountable. Each of the actions included in the roadmap are intended to build upon the preceding action, leading to solutions that are anticipated to be long-lasting and protective.

Although there are currently no enforceable standards at the federal level, the USEPA had issued two key guidelines: (1) Interim Recommendations to Address Groundwater Contaminated with PFOA and PFOS;[10] and (2) a Lifetime Drinking Water Health Advisory (LHA) of 70 ppt for PFOA and PFOS.[11] In 2022, the USEPA issued interim updated drinking water health advisories for PFOA and PFOS that replaced the LHA issued in 2016. The 2022 updated advisory levels, which were based on new data and took into consideration lifetime exposure, indicated that some negative health effects may occur with concentrations of PFOA or PFOS in water that are near zero.[12] At the same time, USEPA also issued final health advisories for hexafluoropropylene oxide dimer acid (HFPO-DA) and its ammonium salt (commonly known as GenX chemicals) and perfluorobutane sulfonic acid (PFBS). GenX chemicals (known as "short-chain" PFAS) are considered a replacement for PFOA, while PFBS is considered a replacement for PFOS.

Recently, the USEPA announced proposed National Primary Drinking Water Regulations (NPDWRs) for six PFAS.[13] The NPDWRs cover PFOA, PFOS, perfluorononanoic acid (PFNA), HFPO-DA, perfluorohexane sulfonic acid (PFHxS), and PFBS. The USEPA anticipates finalizing the regulations by the end of 2023. The interim health advisories issued in 2022 will remain in place until the NPDWRs are finalized and go into effect.

In the absence of final federal regulations, some states are currently regulating PFAS in drinking water and have adopted Maximum Contaminant Levels (MCLs). At the time of this article, these states included Maine, Massachusetts, Michigan, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Vermont, and Wisconsin. Both Delaware and Virginia were in the process of establishing MCLs and Florida was reportedly on course to adopt its own MCLs if the USEPA has not finalized its standards for PFAS in drinking water by 2025.

Meanwhile, other states have adopted guidance levels, notification levels, and/or health advisories for PFAS in drinking water. At the time of this article, these states included Alaska, California, Colorado, Connecticut, Illinois, Maryland, Minnesota, North Carolina, New Mexico, Ohio, Oregon, and Washington.

Has PFAS Been Banned?

PFAS can be found in many consumer products, including (but certainly not limited to) non-stick cookware; personal care products (e.g., shampoo, dental floss, nail polish, cosmetics); cleaning products; textiles and leather, as well as coatings used to repel water, oil, and stains (both consumer and factory applied); water-resistant fabrics and clothing items (e.g., rain jackets, umbrellas, tents); and paper products (e.g., grease- and/or moisture-resistant paper and containers).

In addition to PFAS-related regulations to address environmental contamination, regulations aimed at PFAS in consumer products and goods are also being considered at the state level. Some examples include:

State	Ban
California	2022 ban on PFAS in textiles and cosmetics[14]
California	2021 ban on PFAS in juvenile products for infants and children[15]
Maine	2021 ban on sale of carpets, rugs, and fabric treatments containing intentionally added PFAS; any product containing intentionally added PFAS[16]
Washington State	2021 ban on PFAS in consumer products and packaging[17]

A number of other states are in various stages of preparing, voting on, or enacting bills that include similar PFAS bans.

Are There Any Remediation Standards for PFAS?

On August 26, 2022, the USEPA announced that it will propose designating certain PFAS chemicals, including PFOA and PFOS (and their salts and isomers), as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which requires that response actions taken under CERCLA protect public health and the environment. This USEPA proposal is being made under the aforementioned PFAS Strategic Roadmap, which is a commitment from the USEPA to protect individuals and communities from the health risks posed by certain PFAS chemicals. If finalized, this rule would require federal reporting of PFOA and PFOS releases, which would provide the USEPA with improved data and the option to require remediation and seek cost recovery. Other spill and release reporting requirements would also apply, as the proposed rule would also require responsible parties to immediately report releases of PFOA and PFOS that meet or exceed reporting thresholds to the National Response Center (NRC), state, or Tribal emergency response commission, as well as the local or Tribal emergency planning committee (local emergency responders).

The proposed CERCLA listing may also allow the USEPA to define more PFAS chemicals as hazardous substances under CERCLA and eventually, to establish remediation standards. On April 13, 2023, the USEPA issued an Advance Notice of Proposed Rulemaking (ANPRM), which requests public input regarding the potential future hazardous substance designations of PFAS under CERCLA.[18] Through this ANPRM, the EPA is seeking input on whether to propose to designate additional PFAS, including HFPO-DA or GenX, and compounds that degrade in the environment by processes such as biodegradation, photolysis, and hydrolysis, to form certain PFAS.

At the state level, there are a variety of approaches to setting remediation standards and overall, there is a lack of consistency from state to state. Some states have worked to develop enforceable and sometimes more stringent standards. An online 2022 Bryan Cave Leighton Poisoner LLP article[19] notes that several states have established screening levels to remediate certain PFAS contamination in groundwater to concentrations below the USEPA's 70 ppt LHA, including Illinois, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, and

Vermont. Meanwhile, Colorado, Florida, Montana, Pennsylvania, and Rhode Island have adopted the USEPA's LHA as their remediation standard. Other states have adopted remediation standards that are higher than the USEPA's LHA, while still others have adopted other individual PFAS standards.

How Are PFAS Evaluated During Environmental Due Diligence and Risk Evaluation?

Until recently, PFAS could be easily overlooked during environmental due diligence and risk evaluation processes associated with property transactions because it is not currently listed as a CERCLA hazardous substance. If the USEPA's proposed rule becomes effective, PFOA and PFOS would be CERCLA-listed hazardous substances, which opens the door to more consistent identification of PFAS issues as potential liabilities during environmental diligence, including in Phase I Environmental Site Assessment (ESA) reports. On February 13, 2023, the USEPA issued its final rule incorporating the recently updated ASTM E1527-21 standard for conducting Phase I ESAs into the "all appropriate inquires" (AAI) requirement under CERCLA. The updated ASTM E1527-21 standard clarifies that, until a contaminant is a CERCLA-listed hazardous substance, it is not required to be addressed in a Phase I ESA. As a result and at this time, although PFAS are coming under increasing regulatory scrutiny and have been the subject of environmental risk assessment, investigation, remediation, and litigation, unless an evaluation of emerging contaminants, which include PFAS, is specified as a non-scope item, a discussion of related environmental liabilities is not currently a requirement for a Phase I ESA to be ASTM compliant. Additionally, state-specific regulations may or may not be addressed in ASTM-compliant Phase I ESAs.

Without CERCLA listing, known and potential on-site environmental conditions associated with PFAS would not meet the definition of a Recognized Environmental Condition (REC) per the ASTM standard for conducting Phase I ESAs. The USEPA's proposed designation of two PFAS chemicals, PFOA and PFOS (and their salts and structural isomers), as hazardous substances under CERCLA is, partially, an attempt to close this gap. Without this designation, the potential severity of PFAS-related conditions may not be fully addressed in an ASTM-compliant Phase I ESA report. However, this lack of CERCLA listing does not preclude regulatory agencies from requiring investigation and/or remediation of a site impacted by PFAS. As a result, if a prospective property transaction involves a facility that uses or produces PFAS (or was historically involved in such use or production), or has used AFFF in a fire suppression system, the potential risk of acquiring that property could be significant with respect to future remediation costs and insurability.

At this time, it is not known when the USEPA expects to finalize the proposed CERCLA listing rule. Until the rule is finalized, it is prudent to understand this significant and potentially overlooked risk when performing environmental due diligence or other environmental risk evaluations. The key is understanding the potential for environmental impact due to PFAS, not only on the property, but also on adjacent properties.

Potential risks related to PFAS use or manufacturing may include environmental contamination requiring costly and long-term remediation. As increased environmental sampling for PFAS occurs, additional PFAS manufacturing sources could be discovered. PFAS contamination has the potential to result in workers' compensation claims, as well as general liability claims from neighboring properties due to property damage from contamination and/or bodily injury from PFAS exposure. Consequently, an insurance company may elect to automatically exclude PFAS from coverage under an environmental insurance policy, and that exclusion may affect a property acquisition strategy that includes purchasing environmental insurance to manage long-term risk.

Conclusion

PFAS have documented human and environmental risk factors and are firmly centered on the USEPA's and states' radars, as well as being in the national and international spotlight. The cost of successfully remediating a property impacted by PFAS can be very high (or cost prohibitive) based on the current standards and guidelines, which call for extremely low remediation levels in the ppt range (with some states aiming for the parts per quadrillion range or, in the words of one USEPA official, "near zero levels"). Entities involved in the prospective acquisition or insuring of a facility or property that uses or produces PFAS (or did so in the past) should retain the services of an environmental consultant experienced in not only compliance with the ASTM standard, but with knowledge of emerging risks that may result in acquiring an asset with potential hazards at a significant cost to remediate that may be difficult to insure.

Connect with Us

To understand more about how Chubb Global Risk Advisors' environmental due diligence services can help you assess the potential impact of PFAS on property you may wish to acquire, contact us today.

Globalriskadvisors@chubb.com
866.357.3797 (toll-free)

www.chubb.com/CGRA

1. https://www.govinfo.gov/content/pkg/FR-2016-05-25/pdf/2016-12361.pdf
2. https://pfas-1.itrcweb.org/wp-content/uploads/2022/09/FT_PFAS_Fact_Sheet_083122_508.pdf
3. https://www.epa.gov/sites/default/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf
4. https://www.epa.gov/newsreleases/biden-harris-administration-announces-2-billion-bipartisan-infrastructure-law-funding
5. https://www.scientificamerican.com/article/forever-chemicals-are-widespread-in-u-s-drinking-water/
6. https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm
7. https://www.sciencedirect.com/science/article/abs/pii/S0300483X20302043
8. https://www.epa.gov/system/files/documents/2022-06/technical-factsheet-four-PFAS.pdf
9. https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024
10. https://www.epa.gov/pfas/interim-recommendations-addressing-groundwater-contaminated-pfoa-and-pfos#:~:text=The%20guidance%20recommends%3A,further%20investigation%20at%20a%20site
11. https://www.govinfo.gov/content/pkg/FR-2022-06-21/pdf/2022-13158.pdf
12. https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos
13. https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas#:~:text=On%20March%2014%2C%202023%20%2C%20EPA,known%20as%20GenX%20Chemicals)%2C%20perfluorohexane
14. https://www.morganlewis.com/pubs/2022/10/california-bans-pfas-in-textiles-cosmetics-but-governor-vetoes-reporting-requirement
15. https://www.sgs.com/en/news/2021/10/safeguards-13921-california-usa-regulates-pfas-in-juvenile-products
16. https://www.maine.gov/dep/spills/topics/pfas/PFAS-products/index.html
17. https://ecology.wa.gov/Waste-Toxics/Reducing-toxic-chemicals/Addressing-priority-toxic-chemicals/PFAS/Food-packaging#:~:text=As%20of%20May%201%2C%202024,with%20PFAS%20chemicals%20intentionally%20added
18. https://www.epa.gov/superfund/advanced-notice-proposed-rulemaking-potential-future-designations-and-polyfluoroalkyl
19. https://www.bclplaw.com/en-US/events-insights-news/pfas-update-october-2022-state-by-state-groundwater-regulations.html