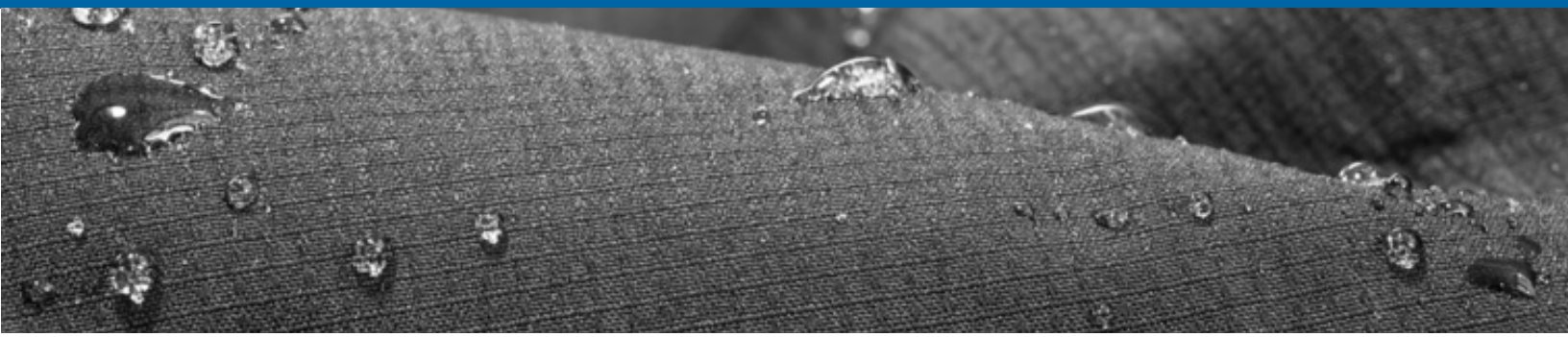
PFAS services



what is PFAS?

Per- and polyfluoroalkyl substances (PFAS) were used in the manufacture of Teflon, breathable water-proof fabrics, carpet and textile coatings, treated food wrappers, wire coatings, aqueous fire-fighting foam (AFFF), and specialty dyes and paints. The most commonly studied PFAS compounds are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). These are the eight-carbon chained molecules used in the majority of PFAS products.

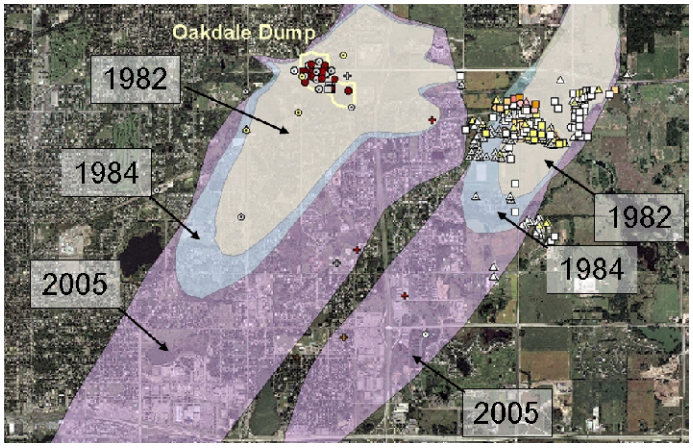
The fluorine-carbon bond is one of the strongest chemical bonds and gives products made with PFAS the highly desirable properties of chemical, heat, and oil resistance; physical durability; and low electrical conductivity. Even though PFAS compounds were widely used in commercial and consumer products, they were made by a small handful of companies, and PFOA and PFOS are no longer produced in North America.

PFAS in water

PFAS are unlike any other water contaminant. The same properties that make PFOA and PFOS durable and resistant also make them extremely persistent in the environment. PFOA and PFOS are unique because they are highly soluble in water, do not degrade or bio-transform, and do not precipitate or adsorb onto sediment. This means that even a very small amount of these compounds can spread widely with groundwater flow and remain detectable for many years. Because of their diffuse nature, identifying a source can be difficult and in many cases, the source is non-point in nature. The U.S. Environmental Protection Agency has determined that PFAS are suggestive of causing cancer in humans and, in May 2016, issued a health advisory limit (HAL) of 70 parts per trillion (ppt) for the combined level of PFOA and PFOS in drinking water. These levels are some of the lowest ever issued for a contaminant and represent a significant challenge, because PFAS have been found to be present at very low levels in many settings.

making informed decisions requires reliable data

With parts per trillion level concentrations, data quality and data reliability are critical for project success. Barr has developed best practices for sample collection to reduce or eliminate water-sample-and-blank cross contamination. Due to our diligent field collection methodology, Barr has reduced and eliminated detectable concentrations of PFAS in field blanks for more than 10 years. Barr has also worked with multiple laboratories to help them reduce or eliminate method blank cross contamination that may occur during the sample handling and analysis process. Consequently, clients can rely on the data collected by Barr to make well-informed decisions.



Barr's groundwater modeling results suggested that PFOA- and PFOS-contaminated groundwater from the former Oakdale Disposal site in Washington County, Minnesota, may have migrated approximately 24,000 to 30,000 feet to the southwest.

municipal water supply evaluation

Treating a contaminated water supply can be a challenging process—municipalities want to know what options

exist for either the removal of the contaminants or the replacement of the water supply. Barr has helped numerous municipalities evaluate water supplies that have become tainted with difficult-to-treat compounds such as PFAS and 1,4-dioxane. Our work has included evaluation of the existing treatment system, potential process changes or additions, and alternative water supply options—with a focus on developing practical solutions. When necessary, we have completed bench- and pilot-scale studies to confirm process removal efficiencies. Barr has provided design and construction oversight services to implement the solutions identified by these evaluations.

PFAS fate-and-transport modeling

Barr is recognized as a worldwide expert in fate-and-transport modeling of PFAS. In 2005, Barr developed solute-transport models for the Minnesota Pollution Control Agency and Minnesota Department of Health to evaluate the emerging PFAS groundwater contamination in Washington County, Minnesota. Barr was instrumental in identifying a link between surface- and stormwater pathways and groundwater contamination, as well as predicting where PFAS would subsequently be found in groundwater. We also assisted in evaluating alternative drinking water supplies, new municipal wells, carbon treatment units, and groundwater remediation at its former disposal area. For a manufacturing facility in Europe, Barr helped identify one of the most important sources of PFOA groundwater contamination—air deposition and leaching to the water table. Barr developed PFOA retardation coefficients for saturated and unsaturated materials and developed sophisticated unsaturated-zone solute-transport models for input into groundwater fate-and-transport models. Barr's experts convinced the regulators that air deposition could be a much more important source than conventional spill sources.

In 2015, PFAS contamination was found near three manufacturing plants operated in New England, resulting in a large amount of public attention. Barr is serving as the client's technical expert on fate-and-transport, site investigation and remediation of PFAS, guiding the projects, and negotiations with state and federal regulators and assisting in litigation support for several toxic tort cases. Our work includes PFOA air-dispersion modeling, unsaturated zone modeling, fate-and-transport modeling in groundwater, investigation, data validation, and remedial design.

Barr has also been involved in evaluating PFAS migrating from municipal landfills and from airports and refineries where fire-fighting training has resulted in the discharge of AFFF onto the ground. The challenge of these situations is to characterize the actual source of the contamination and to differentiate this source from ambient background levels.

treating challenging contaminants

Barr is a leader in evaluating water treatment options for contaminants of emerging concern like PFAS. Our water and wastewater engineers help clients evaluate PFAS impacts in their groundwater, process wastewater, and other sources; work with them to navigate treatment and non-treatment options; and provide support for emergency-response PFAS water-treatment system design and implementation.

Barr has helped numerous clients evaluate and treat water impacted by difficult-to-treat compounds, including PFAS. Our work often begins by preparing initial evaluation of water treatment options and providing preliminary recommendations and information to our client. We can then design and complete bench- or pilot-scale tests to evaluate the water treatment approaches and their effect on our client's water-quality and treatment goals. After testing the technology, Barr designs and implements full-scale water treatment systems, including pre- and post-treatment, and also provides start-up and operations assistance.

how can Barr help you?

Barr provides the weight of experience and expertise in negotiating with agencies on behalf of our clients, often by educating rather than advocating. We have saved our clients millions of dollars by applying our understanding of PFAS fate-and-transport to limit liability, narrow data collection activities, implement water-treatment systems, and focus on long-term solutions.