



PFAS – Per- and Polyfluoroalkyl Substances

Environmental Context—Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonate (PFOS), and GenX, a next generation PFAS replacement. PFAS have been manufactured and used in a variety of industries and consumer products worldwide since the 1940s. They are a constituent of carpets, clothing, fabrics, paper packaging for food, and cookware resistant to water, grease or stains. They are also used in aqueous firefighting foams (AFFFs) that are currently used at airports and industrial areas. Of the thousands of PFAS compounds historically produced, only PFOA and PFOS have been studied extensively. These chemicals are persistent in the environment and in the human body. Moreover, they can accumulate over time. Exposure to PFAS can lead to adverse human health effects, including cancer, immune suppression, and thyroid hormone disruption.

Resources and Instrumentation—CESE has extensive analytical expertise and advanced instrumentation in the quantification of trace amounts of PFAS compounds, in ground and surface waters, biological tissues, soil, and sediment. Instrumentation includes:

- Ultra performance liquid chromatograph/tandem mass spectrometer (UPLC/MS/MS)
- Gas chromatograph/tandem mass spectrometer (GC/MS/MS)
- Custom sample extraction equipment to eliminate contamination of samples with PFAS
- Genevac automated concentrator
- Clean Room for sample preparation



Research Capabilities—CESE has considerable capacity to support a diversity of research projects related to PFAS analysis by providing quantitative assessments of a wide array of these compounds. CESE is in the process of becoming one of the only laboratories in the state to be certified by the CT Department of Public Health (DPH) for the analysis of PFAS in drinking water at detection levels of 1-2 ppt.

Examples of projects that CESE can support include:

- Assessment of baseline levels of contamination in various environmental media, including soil, groundwater, and surface water.
- Human and biological risk assessment through the quantification of PFAS in biological tissues.
- Assessment of PFAS concentrations and leachability in consumer products, including cosmetics, foodstuffs, and bottled water.
- Analysis of PFAS in public drinking water supplies using a DPH certified EPA Method 537.1.
- Validation of ground, surface, and drinking water treatment technologies for the removal of PFAS.

