

Pushing the Boundaries on Quantitative PFAS Analysis

Darlene Hoogenes-Stastny, Katrina Zwambag, ALS Environmental

There are hundreds of chemicals that can be classed as PFAS (Per and poly-fluorinated Alkyl Substances). Accredited laboratories typically determine approximately 30 of these specific chemicals. ALS continues to be a global leader in support of the on-going investigation into PFAS impacts on the environment and the many compounds that are currently not actively measured in routine analysis. Traditional PFAS analysis only targets the key analytes and therefore may or may not greatly underestimate the presence of PFAS in the environment. US EPA continues to discuss the ongoing PFAS Action Plan to address these long-lasting 'forever chemicals'. Under the CWA Analytical Methods it was announced that in collaboration with the US Department of Defense a more extensive list of 40 compounds would be analytically developed in support of wastewater as well as surface water, groundwater, leachate, soil, sediment, biosolids, and fish tissue matrices. This includes the following compounds not routinely tested at accredited laboratories:

Abbrev.	Name - Acid/Neutral Form	CAS#
3:3 FTCA	2H, 2H, 3H, 3H-perfluorohexanoic acid	356-02-5
5:3 FTCA	2H, 2H, 3H, 3H-perfluorooctanoic acid	914637-49-3
7:3 FTCA	2H, 2H, 3H, 3H-perfluorodecanoic acid	812-70-4
NFDHA	Perfluoro-3,6-dioxiheptanoic acid	151772-58-6
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	113507-82-7
PFMPA	Perfluoro-3-methoxypropanoic acid	377-73-1
PFMBA	Perfluoro-4-methoxybutanoic acid	863090-89-5

ALS Globally has been a market leader in the PFAS testing capabilities starting from the Australian Marketplace and actively explored and implemented in the North American region. ALS Waterloo is proud to release a new service offering in support of EPA's invested efforts in targeting the solutions needed to address PFAS in the environment and on-going PFAS studies and remediation. ALS will now offer an extended list of targets to reach a quantitative LCMSMS scan of 52 compounds.

This compound list and associated detection limits supports the rapid movement in the United States on control and ban of these contaminants in the environment. The extended suite can be obtained from the existing 60mL sample submission bottle for the regular suite of targets meeting all regulatory guidelines globally.

In order to continue obtaining a deeper knowledge of PFAS compounds and their fate, analytical laboratories need to continue to pursue the full scope of analytes. ALS Waterloo's extended suite offers analysis of PFECHS which is found in aviation hydraulic oils as well as fluorotelomer carboxylic acids 3:3 FTCA and 5:3 FTCA that are major components in legacy landfill leachates. The following targets not listed above are included in the extended list:

Abbrev.	Name - Acid/Neutral Form
PFECHS	n-Decafluoro-4-(pentafluoroethyl)cyclohexanesulfonate
FHUEA	n-2H-perfluoro-2-octenoic acid (6:2)
FOUEA	n-2H-perfluoro-2-decenoic acid (8:2)
FDUEA	2H-Perfluoro-2-dodecenoic acid
6:2 FTCA	n-2-perfluorohexyl ethanoic acid (6:2)
8:2 FTCA	n-2-perfluorooctyl ethanoic acid (8:2)
10:2 FTCA	n-2-perfluorodecyl ethanoic acid (10:2)

ALS has always concluded that there is a need to expand analytical suites to cover other PFAS that may arise from weathering that might include some oxidation and hydrolysis and, ideally, to have better models for predicting environmental endpoints. Without measuring all of these compounds the potential for ongoing contamination, as these compounds go through weathering processes, is a large liability. Case Studies will be reviewed to show the impact of the never before measured target analytes on Canadian Sites. Questions will be answered: How prevalent are they? How will this change the on-going scope of PFAS remediation and site characterization? Further product breakdown scenarios will be discussed and explored to highlight where these new compounds fit in the biodegradation of AFFF.

Pushing the Boundaries on Quantitative PFAS Analysis

Darlene Hoogenes-Stastny

Darlene has been working in the environmental industry for over 30 years. Her experience working for environmental laboratories spans waters, soils and in the last 6 years has come to include tissue and air. From 2010 to present Darlene has been the contract lead for a standing offer agreement with the Department of National Defence (DND) which includes the Royal Military College- Environmental Services group. On a federal level DND has been instrumental in initiating PFAS testing and requesting expanded compound lists and lower detection limits which ALS has been able to provide. Darlene is currently the ALS Canada-National Air Quality Specialist. Her early career experience includes 7 years in health care (geriatrics), 3 years in the automotive industry, as well as 2 years in environmental compliance. She is a member of OOWA (Ontario On-Site Wastewater Association), OMA (Ontario Mining Association), an associate member of AWMA (Air & Waste Management Association), and a CET (certified environmental technologist). Her interests include spending time with family, horseback riding, travel, and she is a member of a Dutch language community theatre group.

Katrina Zwambag

Katrina Zwambag is the Business Manager at the ALS Waterloo laboratory. Her previous role as the LCMS Manager involved extensive work in the research and method development of PFAS compounds. Previously Katrina's responsibilities were focused on coordination of the LCMS department, method validations, quality control and maintenance of instrumentation. In her 13 year laboratory career Katrina has held a variety of positions, including analyst, instrument operator, supervisor, team lead and manager, providing her with a well-rounded skillset which she has utilized to find improvements and efficiencies throughout the lab. Katrina has a certificate in Biotechnology from Mohawk College and has completed the ALS iLEAD leadership and Management designation.