Characterization of the Fate and Biotransformation of Fluorochemicals in AFFF-Contaminated Groundwater at Fire/Crash Testing Military Sites

Collaborators: Drs. David Sedlak and Lisa Alvarez-Cohen, Dept. of Civil Engineering, UC Berkeley

Technical Objectives

It is our goal to fully delineate the fluorochemicals that persist in AFFF-contaminated groundwater, sediment, and soil at military sites where fire-training activities occurred and to evaluate their impact on priority pollutant transport and bioremediation.

Publications


Catalyzing Rapid Information Transfer Among Key Stakeholders on Per- and Polyfluoroalkyl Substances (PFASs) at Contaminated Military Sites

Collaborators: Dr. C. P. Higgins, Colorado School of Mines and Dr. R. Deeb, Geosyntec Consulting, Inc.

TARGET AUDIENCE

We have identified three target (stakeholder) audiences that ultimately interact with one another and share goals and barriers to state-of-the-art knowledge on per- and polyfluoroalkyl substances (PFASs) at military sites. Our three stakeholder groups include 1) remedial program managers (RPMs) within the Department of Defense (DoD), 2) contractor/consultants that support RPMs, and 3) vendor laboratories and commercial manufacturers of PFAS standards. A common goal of these three groups of stakeholders is the need to know which PFASs occur, and at what concentrations in environmental media (groundwater, sediment, soil, surface waters, biota) at military sites. RPMs and contractor/consultants rely on the availability of robust, quality data on PFAS occurrence generated by vendor (commercial) laboratories for decision-making purposes. It is critical that timely information on PFASs in aqueous film-forming foam (AFFF)-contaminated media reach these groups in near-real-time and simultaneously.

TECHNOLOGY TRANSFER APPROACH

The overarching objective of this technology transfer project is to expedite the transfer of a base of knowledge of both the types of PFASs that occur at military sites as well as how they can be reliably measured in environmental media to the target audiences identified above.

OBJECTIVES

1. **Frequently Asked Questions (FAQ)** – A short (2-4 page) document capturing critical questions about PFASs at AFFF-contaminated sites.
2. **Reference Document** – An extended Reference Document will be created that includes state-of-the-art knowledge on individual PFASs and their precursors at military sites. The primary sources of information used will include peer-reviewed literature and SERDP-funded data on PFASs in groundwater, sediment, and soil. The Reference Document will contain easy-to-understand information on acronyms with structures, a glossary of terms, compilations of concentration data, and frequency of occurrence data on individual PFASs.
3. **Videos** – Three short, succinct, and not overly technical videos will be filmed at Oregon State University and posted for wide distribution to venues including YouTube and to the SERDP/ESTCP website, which currently houses “on-demand videos” under topic areas in Environmental Restoration.
4. **On-Line Workshops**. On-line workshops targeting RPM stakeholders will be conducted and consist of disseminating the information in the FAQ and extended Reference Documents.
5. **On-Site Analytical Workshops for Vendor Laboratories** – Oregon State University and Colorado School of Mines will host on-site analytical workshops for vendor laboratories and any other stakeholders who are interested in gaining hands-on experience with alternative analytical capabilities that capture the range of PFASs in AFFF-contaminated media.
Ecosystem Impacts of Oil and Gas Inputs to the Gulf (ECOGIG) – Subcontract to the University of Georgia (M Joye, PI)

The Field lab is part of the Hydrocarbon and Dispersant Chemistry Team of Ecosystem Impacts of Oil & Gas Inputs to the Gulf (ECOGIG-II). (http://ecogig.org/hydrocarbon-dispersant-chemistry). The laboratory developed methods for the surfactant components of Corexit, the oil dispersant, used on the 2010 Gulf of Mexico oil spill. The methodology is now being applied to determine the fate of Corexit surfactant components in microcosms containing microbial consortia from shallow and deep Gulf water locations, marine sediments, and in marine snow.

Publications:


The Field lab will also be working in collaboration with Dr. Mary Beth Leigh (http://faculty.iab.uaf.edu/mary_beth_leigh), a microbiologist with the Institute of Arctic Biology at the University of Alaska, Fairbanks on a project funded (2015-2017) by the Coastal Marine Institute titled, “Fate and persistence of oil spill response chemicals in arctic seawater.”