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LSPA Continuing Education Course
PFAS Forensics*: *Tools and Techniques for Site Investigations

COURSE DESCRIPTION

This course will appeal to LSPs and other environmental professionals as it will cover environmental forensics as applied to the investigation of sites impacted by per- and polyfluoroalkyl substances (PFAS)—a group of thousands of anthropogenically produced, fluorine-containing organic compounds. Because analytical techniques can now detect some PFAS at low parts per trillion in groundwater, and they have had ubiquitous commercial and industrial use as far back as the 1950's, the number of sites impacted by these environmental pollutants are growing, and at a rapid pace. In short, environmental professionals face many challenges to understanding the source, nature, and extent of PFAS contamination at a site, especially if there may be multiple sources or comingled plumes.

Many of the forensics tools and techniques that can be applied to PFAS build upon those developed for other complex classes of contaminants, including petroleum hydrocarbons, PCBS, and dioxins. In addition, PFAS have some unique properties that need to be considered in a forensics investigation, from sampling and analysis to data analysis and visualization. In presenting a variety of PFAS forensics tools and techniques, the goal of the webinar is to help practitioners reach defensible conclusions, while avoiding overinterpretation of the data.

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COURSE AGENDA

This live webinar will be presented by a part of the National Groundwater Association task force that has developing a white paper on PFAS forensics. As a long-form webinar, instructors will take a deep dive into the unique chemistry, potential sources, and complex fate and transport properties of PFAS, as well as the specific analytical techniques and data analysis tools being applied to the forensics of these "forever chemicals." The agenda will cover the following topics:

1. Introduction – PFAS 101
   a. Chemical Structures of PFAS
   b. Unique Properties

2. Overview of Sources and Source Types
   a. Sources of PFAS
   b. Anthropogenic "Background"

3. Fate & Transport Mechanisms and Pathway Demonstration
   a. Physical Mechanisms of PFAS Transport and Vadose Zone Considerations
   b. Precursors and Precursor Transformation

4. Chemical Forensics and Analytical Techniques
   a. Standard Analytical Techniques
   b. Advanced Analytical Techniques

5. Data Analysis and Statistical Methods
   a. Data Visualization
   b. Statistical Analyses

6. Panel Discussion with Q & A

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PRESENTER BIOGRAPHIES

Grant Carey, PhD
Grant Carey is President of Porewater Solutions, and has more than 30 years of experience specializing in PFAS fate and transport; site characterization and remediation; DNAPL delineation; groundwater modeling; environmental forensics; and mining water management. Dr. Carey is currently involved with seven SERDP and ESTCP projects for the US Department of Defense with a focus on PFAS remediation, and most recently the development of PFAS e-learning modules. He has developed a proprietary reactive transport model for evaluating PFAS fate and remediation (In-Situ Remediation (i.e., ISR Model)), and he is co-developer of the Visual PFAS™ software tool. Dr. Carey is also an Adjunct Research Professor at Carleton University and an Adjunct Professor at the University of Toronto.

Erica DiFilippo, PhD
Erica DiFilippo has extensive experience addressing the fate and transport of organic and inorganic chemicals in the environment. She has conducted numerous studies on the fate and transport of per- and polyfluoroalkyl substances (PFAS), biodegradation of PFAS precursors, and the use of innovative technologies for measuring in-situ concentrations of organic contaminants in sediment pore-water. Dr. DiFilippo has also provided litigation support (expert reports and deposition testimony) on PFAS-related environmental cases. An active member of the PFAS team with the Interstate Technology Regulatory Council (ITRC), Dr. DiFilippo has contributed to the Physical and Chemical Properties and Fate and Transport sections of the main document and its associated fact sheets. She also provided support for ITRC's web-based PFAS expert roundtables. Dr. DiFilippo leads the National Ground Water Association's (NGWA) PFAS working group and has participated in expert panel discussions on PFAS forensics and development of NGWA's PFAS forensics white paper.

Jeremiah Duncan, PhD
Jeremiah Duncan is a Senior Chemist in the Environmental Remediation and Environmental Site Investigation Groups at GZA, and he has more than 25 years of experience in analytical and environmental chemistry. Dr. Duncan brings chemical expertise and data analysis skills to provide forensics support to project teams and clients on PFAS-impacted sites ranging from fire training and large industrial facilities to small businesses and landowners.

Dylan Eberle, PhD, $CPG_{(AK)}$, $PG_{(NH)}$
Dylan Eberle is a Senior Geologist at Geosyntec Consultants' in Boston, MA. He is an Alaska Certified Professional Geologist and New Hampshire Professional Geologist. Dr. Eberle has over 13 years of PFAS experience including leading site investigations, development and evaluation of conceptual site models, fate and transport analyses, source identification, fingerprinting and forensics, and research into destructive technologies. He has worked on numerous PFAS projects throughout the United States, and internationally. In addition, Dr. Eberle has provided his technical expertise on many PFAS litigation projects, supporting testifying experts and serving as an expert witness himself.

Taryn McKnight

Tara McKnight is the Vice President and PFAS Practice Leader for Eurofins Environment Testing in the US, and she has nearly 25 years of experience in the environmental testing industry. As one of the company's subject matter experts on PFAS, Ms. McKnight contributes to multiple organization and agency workgroups to address PFAS challenges, including her effort as co-chair of the National Ground Water Association's subcommittee to develop *PFAS Sampling Guidance and a PFAS Forensics White Paper*. With her expertise she provides technical guidance to clients in setting up programs to achieve their site-specific objectives, and to agencies with understanding their analytical options and data usability considerations.