

Sunday 15 September 2024

Full Day Workshops

Time: 9:00 AM – 5:00 PM

Venue: Adelaide Convention Centre

Registration Fees: \$620 inclusive GST

(The workshop is fully catered and will be provided with morning, afternoon tea and lunch)

Workshop - 2

Site Characterization, Mass Flux, Incremental Sampling Methodology, Artificial Intelligence in Site CleanUp, and Balancing Legacy and Emerging Contaminants In Site CleanUp

About this workshop

This full-day workshop is divided into two sessions.

The morning session will focus on ***Site Characterization and Mass Flux/Mass Discharge***.

The behaviour of contaminants in the subsurface is governed by several inter-related fate and transport processes that may vary in both space and time. In this training course, we will present the conceptual basis for several of these processes, such as physical and chemical properties of the contaminant, and then demonstrate approaches that can be used to calculate the distribution of contaminants between the solid, liquid, and gas phases. Due to the emergence of per- and polyfluoroalkyl substances (PFAS) as contaminants of concern, we will also discuss adsorption processes that occur at phase interfaces (e.g., air-water), which can be particularly important for compounds that exhibit surface active properties. These processes will be described as equations that can be incorporated into mathematical models to evaluate the relative importance of different processes or predict the fate and transport of contaminants in the subsurface.

The second portion of this session will focus on contaminant mass flux and mass discharge. Most regulatory and management decisions regarding contaminated groundwater sites are primarily based on contaminant concentrations. Such decisions can be improved by also considering contaminant mass flux and mass discharge. The information provided will be valuable for virtually all aspects of contaminated site management.

The afternoon session is ***Incremental Sampling Methodology and Artificial Intelligence***.

Incremental Sampling Methodology (ISM) is a statistically supported technique for assessing the mean contaminant concentration in soil, sediment, and other environmental media. Environmental professionals have demonstrated that the methodology can be a useful tool to represent site conditions when applied to bulk particulate materials such as soil, sediment, or waste.

ISM is increasingly used in the environmental field to sample contaminants in soil. Proponents have found that the sampling density afforded by collecting many increments, together with the disciplined processing and subsampling of the combined increments, in most cases yields more consistent and reproducible results than those obtained by more traditional (discrete) sampling approaches.

This AI short course will offer a comprehensive exploration of large language models (LLMs) and their diverse applications in environmental science. Beginning with an introductory overview, participants will embark on a journey to understand the foundational principles underpinning LLMs, tracing their evolutionary trajectory and examining their far-reaching influence across various fields. Through interactive discussions and real-world examples, attendees will gain valuable insights into the significance and

potential of LLMs in addressing complex environmental challenges, setting the stage for an enriching learning experience.

Why Attend?

This workshop has been developed in response to the critical need for regulators and practitioners to share experiences to create standard practices and address knowledge gaps, Advances in site characterization, chemicals and physical properties of contaminants, Mass Flux – Mass Discharge measurements, Effective management of contaminated sites, and Fate and Transport. As well as offering technical lessons from the study of past projects, the course offers semi-structured discussions, problem-solving and personal interactions that give participants deep insight into site characterization and mass flux.

ISM and AI sessions of the workshop have been developed to address the need for a more comprehensive and cost-effective sampling methodology to address soil heterogeneity and how to use artificial intelligence to develop sampling plans to address risk assessment and site remediation.

The workshop will offer invaluable networking opportunities for practitioners, regulators, and researchers. Delegates will get the opportunity to build connections with instructors as well as with their fellow delegates.

This workshop will provide an opportunity to put your organisation at the forefront of best practices in dealing with contaminated sites.

Workshop attendees will receive:

- 6.0 hrs of CPD point
- Link to the workshop paper
- Presentation slides (in secured PDF)
- a downloadable online resource folder on USB.

Program

Day Program -

Morning Session: (3 Hrs) – By Naji Akladiss and Charles Newell	
9:00 – 10:00 AM	Workshop Start
10:00 – 10:30 AM	Morning Tea
10:30 – 12:30 PM	The workshop continues
12:30 – 1:30 PM	Lunch Break
Afternoon Session: (3 Hrs) – By Susan Schow and Jeremy Musson	
1:30 – 3:00 PM	Workshop continues
3:00 – 3:30 PM	Afternoon Tea
3:30 – 5:00 PM	The workshop continues incl. Q&A and wrap-up

Morning Session (9:00 AM – 12:30 PM)

Site Characterization and Mass Flux/Mass Discharge

- *Conceptual Site Model (CSM) for a typical NAPL-Dissolved phase plume*
- *The fate and transport of NAPLs in the subsurface*
- *The concepts of an Integrated Site Characterization*
- *Phase Distribution*
- *Example problem for solubility, Volatility, and Phase Distribution and Transport*
- *Conceptual framework for mass flux/mass discharge*
- *Five methods to determine mass discharge in groundwater*
- *Practice exercise on mass discharge calculation*

- *Estimating PFAS mass discharge from the unsaturated zone to groundwater*
 - *Mass discharge at solvent, hydrocarbon, and PFAS sites*
 - *Using mass discharge to evaluate impacts*
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Afternoon Session (1:30 PM – 5:00 PM)

Incremental Sampling Methodology and Artificial Intelligence

Incremental Sampling

- What is Incremental Sampling Methodology (ISM)?
- How Soil Heterogeneity is addressed by ISM
- Sampling Methodology (guidance on field planning)
- Laboratory processing and analysis
- Statistical considerations and use of replicates
- ISM and Risk Assessment

Artificial Intelligence

- Introduction to Large Language Models
- Understanding the AI Black Box Dilemma
- Conversations with AI Chatbots
- Evaluation of Environmental Contamination Assessment
- Checking References and Plagiarism

Presenters



Naji Akladiss, P.E.; CQE
Environmental/Quality Engineer,
Former Project Manager, Maine Department of Environmental Protection, USA..

Naji Akladiss, P.E., CQE is a former Project Manager for the Maine Department of Environmental Protection (MEDEP). Starting in 1989 as an Analytical Chemist and quality assurance manager in the MEDEP Laboratory and later as a Project Manager in the Federal Facilities Program, he served the State for over 32 years. Naji managed the clean-up of two Superfund sites with experience in environmental clean-up technologies and site remediation. He was the Leader of six Interstate Technology and Regulatory Council (ITRC) Teams including the Integrated Site Characterization Team as well as being the Co-Leader of the Fractured Rock Team. He also served on the ITRC Board of Advisors from 2017 until 2022, and the recipient of the ITRC's Lifetime Achievement Award in 2023. He is a licensed Professional Engineer in the State of Maine and a Certified Quality Engineer (CQE) by the American Society for Quality. Prior to joining the MEDEP Naji worked for Rockwell International as a Process/Quality Engineer in Rockwell's printed circuit board plant in Maine.



Dr. Charles (Chuck) J. Newell
Vice President/Principal Engineer
GSI Environmental Inc.
USA

Dr. Charles (Chuck) Newell is a Vice President of GSI Environmental Inc. in Houston, Texas, USA. He is a member of the American Academy of Environmental Engineers and Scientists, a NGWA Certified Ground Water Professional, and an Adjunct Professor at Rice University. He has co-authored 12 technical articles on PFAS fate & transport and remediation and is now leading or has led multiple PFAS research projects funded by the U.S. Dept. of Defense. He was awarded the *Hanson Excellence of Presentation Award* by the American Association of Petroleum Geologists, the *Outstanding Presentation Award* by the American Institute of Chemical Engineers, the Strategic Research and Development Program (SERDP) *2014 Project of the Year* as a Co-PI, the ITRC *Environmental Excellence Award* in 2016, the 2020 *Foundation Achievement Award* presented by the Association for Environmental Health and Science, and the 2024 *Gordon Maskew Fair Award* presented by the American Academy of Environmental Engineers and Scientists.



Susan E. Schow, MPH
Retired, Epidemiologist, With the State of Maine Health Data Organization
Member of the Restoration Advisory Board, Brunswick Naval Air Station Superfund Site

Susan E. Schow, MPH, is a retired epidemiologist with the State of Maine Health Data Organization with over thirty years of experience as a multi-disciplinary environmental professional with a background in human health risk assessment, environmental compliance, technical support services, analytical chemistry, and epidemiology. Held multiple federal and state government placements including posts at the Department of Energy's Oak Ridge National Laboratory, the DOE's Hazardous Waste Remedial Action Program, and the Maine Center for Disease Control and Prevention. Experienced in human health risk assessment using hazardous waste characterization data to support risk management and

remedial decision-making at superfund hazardous waste sites. Hands-on experience as a Program Advisor for the Interstate Technology and Regulatory Council's (ITRC) Evaluation of Innovative Methane Detection Technologies Team and the Incremental Sampling Methodology (ISM) Team. She is a Member of the Restoration Advisory Board, Naval Air Station Brunswick Superfund Site, Maine.



Jeremy Musson
Principal Innovation Optimization
Pinyon Environmental, Inc. USA

Bio:

Jeremy Musson is Pinyon Environmental, Inc.'s Principal for Innovation | Optimization Principal. He is a site characterization specialist and remediation geologist with over 20 years of experience in environmental consulting. In his Innovation | Optimization role, Jeremy leads the company's continuous improvement efforts and has been invited to participate in process development and improvement events with partner organizations and clients. The Innovation | Optimization group at Pinyon is also responsible for identifying new uses for existing technology and for developing new technologies that can be used in delivery of high-quality projects to our clients under tighter deadlines and more restricted budgets. Jeremy has been a member of the Interstate Technology and Regulatory Council (ITRC) Industry Affiliates Program (IAP) since 2009, and is a IAP Co-Liaison to the ITRC Board of Advisors. Jeremy has been a contributing author to six guidance documents related to site characterization and remediation.
