PTAC Panel

This panel, hosted by the PTAC Remediation Reclamation Research Committee will showcase innovative tools and research advancing soil and vegetation management for site closure. Presentations will feature emerging guidance for selenium, chloride plume delineation, weed risk management, and updates to key resources including the Subsoil Salinity Tool and Alberta Tier 1 & 2 Guideline Tool.

PTAC Remediation Reclamation Research Committee

Tannis Such
PTAC

Tannis Such is the Director of Environmental Research at Petroleum Technology Alliance Canada (PTAC), bringing over 26 years of experience advancing environmental initiatives in Alberta's oil and gas sector. She leads PTAC's Alberta Upstream Petroleum Research Fund (AUPRF) facilitating multi-stakeholder committees that address key environmental and social challenges. With strong critical thinking and problem-solving skills, she excels at fostering collaboration and driving impactful initiatives.

Jason Desilets
Cenovus

With over 25 years of experience in environmental management within the oil and gas sector, Jason Desilets brings deep expertise in reclamation and remediation strategies and initiatives. He currently serves as a Reclamation & Remediation Specialist at Cenovus Energy, where he oversees projects across their Oilsands and Deep Basin assets, ensuring compliance and progressive restoration of disturbed landscapes.
Jason is recognized across the industry for his leadership and collaboration. He actively contributes to key environmental committees, including the Canadian Association of Petroleum Producers (CAPP) Reclamation & Remediation Committee and multiple Canada's Oil Sands Innovation Alliance (COSIA)

working groups. He also serves as the Co-Chair of the PTAC Remediation and Reclamation Research Committee (RRRC), steering applied research toward practical and sustainable outcomes.

His commitment to innovation and shared knowledge has made him a frequent presenter at industry conferences such as the CLRA Alberta Chapter AGM, where he has showcased initiatives like Faster Forests & Borrow Pit Reclamation, aimed at accelerating the pace and quality of reclamation across Alberta's energy landscape.

Finalization of Research for Selenium and Sulphate Ecotoxicology

Recent ecotoxicology testing investigated the role of sulphate (SO4) in agricultural lands with elevated selenium (Se). The ameliorating effect of SO4 was studied with a range of Se and SO4 concentrations in coarse- and fine-textured soils tested by a battery of five plant species: alfalfa (Medicago sativa), barley (Hordeum vulgare), cucumber (Cucumis sativus), northern wheatgrass (Elymus lanceolatus), and red fescue (Festuca rubra). There was evidence of substantially reduced Se toxicity in presence of SO_4, starting from 250 mg/kg of SO_4. For example, the effect concentration (EC)25 for barley plant biomass was equal to 3.0 mg/kg in fine background soils, spiked by Se with no additional SO_4. With added SO_4, the EC25 for barley plant biomass increased to 20.4 mg/kg of Se for 250 mg/kg of SO_4. For barley grown in coarse soils, EC25 jumped from 2 mg/kg of Se in background to 15 mg/kg of Se with 250 mg/kg SO_4 added. Similar pattern was observed in other plant species in both types of soil. These fundings may lead to substantial reducing of potential remediation volume and associated carbon footprints. The SO_4 effect is being evaluated to develop soil Se guidelines, and savings on remediation efforts addressing low level Se Tier 1 (1 mg/kg) exceedances that occur naturally in Alberta. This research was made possible through funding provided by the Petroleum Technology Alliance Canada (PTAC).

Viktoria Winter

Equilibrium Environmental Inc.

Ms. Winter is a senior environmental scientist/ toxicologist at Equilibrium Environmental Inc., a professional biologist in Alberta, and a professional agrologist in B.C. Ms. Winter received a B.Sc. from Agricultural and Environmental Science at McGill University in 2007. In 2011, she obtained the Master of Environmental Toxicology degree from Simon Fraser University. Ms. Winter has 15+ years of experience in ecotoxicology studies and environmental industry. Her skillset includes toxicology, human health and ecological risk assessment, research in support of environmental toxicology, and numerous field investigations. She has worked on sites impacted by various industrial operations including upstream oil and gas, pesticide and fertilizers applications. Environmental toxicology experience included developing and validating of a new egg-injection protocol and multi-generational study of PBDE exposure in small songbirds, plant and invertebrate toxicity testing for petroleum hydrocarbon impacted soils, and plant toxicity testing for selenium. Ms. Winter worked on the data gap analyses in ecotoxicology, bioavailability and bioaccessibility, phytoremediation and plant tolerance potential studies (TPH, lead, selenium), and on the weight-of-evidence approach to redefine provincial ecological soil selenium guidelines. Ms. Winter is setting up an ecotoxicology lab and going through the process of accreditation (CALA).

Anthony Knafla

Equilibrium Environmental Inc.

Anthony Knafla is a Biochemist and Medical Scientist specializing in human and ecological health risk assessment. He is a Diplomate of the American Board of Toxicology and incorporated Equilibrium Environmental Inc. in 1999. Mr. Knafla has been involved in the support of regulatory agencies decision making processes with best practice recommendations and technical analyses of environmental chemical impacts and associated health risks.

Subsoil Salinity Tool Technical Manual and FAQ

The Subsoil Salinity Tool (SST) Version 3.0 Technical Manual is a supplement to the existing User Manual, and provides additional technical details and supporting information on a range of topics relevant to both subsoil chloride and subsoil SAR/sodium guidelines. This presentation includes a deeper dive into selected topics from the technical manual, including foundational concepts such as linear scaling and the Principle of Superposition and how they are implemented for both vertical and lateral chloride transport modeling. Details are also discussed about soil tortuosity and the effects of water content on upward chloride migration, and the effects of the more detailed transport modeling performed in Version 3.0 in the context of water table depth. A range of breakthrough curves are also shown to aid visualization of various transport scenarios, including the influence of factors such as impact thickness on lateral transport. Complexities and techniques of subarea handling are also discussed, including both source dimension aspects and neural network corrections. Details of the upgraded dugout model from Version 3.0 are also shown along with comparisons to the previous version for context. Additional details of sodium transport modeling will also be discussed, including key differences between sodium and chloride transport. Other SST-related topics from the Frequently Asked Questions (FAQ) will also be discussed, including the important topic of excavation confirmatory sampling evaluation.

Greg Huber
Equilibrium Environmental Inc.

Greg Huber has a Master of Science from the University of Calgary in Chemical and Petroleum Engineering with a focus on environmental topics. He has worked as a professional engineer and project manager for more than 25 years, and has been working with Equilibrium Environmental since 2005. He has been involved in a wide range of complex risk assessments, research projects, guideline development, and remediation projects related to a broad range of soil and groundwater contaminants. He is also involved in transport modeling and protocol and algorithm development for the Subsoil Salinity Tool, and has been teaching the SST course since 2011.

Conventional vs. Passive Management of Noxious Weeds for Final Reclamation of Industrial Sites in the Boreal Forest: A Risk Management-Based Approach

In Alberta, herbicides (and manual removal to a lesser extent) are the conventional methods for controlling or eliminating noxious weeds on reclaimed industrial sites. However, this approach may be counterproductive to re-establishing forest vegetation, as overspray on non-target native forest vegetation may impede the recovery of desirable species. Currently, limited data support alternative methods for noxious weed management. It is also unclear if this practice is truly achieving, and sustaining, the intended objective of removing undesirable plant species to allow desirable plant development. Retrospective Alberta data supports the assertion that noxious weeds tend to decrease over time; however, these analyses are complicated by a lack of early site intervention data. While it may seem implicit that most weedy species will diminish as the forest canopy develops, there is a scarcity of long-term datasets to further substantiate the existing retrospective analyses.

This project aims to overcome these knowledge gaps via two corresponding objectives. Objective 1 will evaluate the effectiveness of herbicide application as a long-term control of weeds in recently reclaimed well pads in Alberta. Objective 2 will evaluate the success of planting tree density as a long-term method of noxious weed control. We propose a long-term, large-scale experiment, where 80 study sites in northern Alberta across different ecological subregions within the Boreal Forest will randomly receive one of two treatments, herbicide application and control (i.e. no herbicide application). Within a subset of sites, 16 sites will be planted with a higher than-usual density (4,000 stems ha-1) of broadleaf tree/shrub species to speed the pace of forest canopy closure. While the present proposal encompasses a 3-year timeframe, allowing for the setup and short-term data collection of vegetation dynamics, we anticipate continued measurement in the longer term as forest growth and plant community succession are long-term endeavours. This project offers significant environmental and social benefits by addressing the efficacy of herbicide application and planting tree density in managing weed populations on reclaimed well pads in Alberta.

Andrés G. Rolhauser
NAIT

Andrés G. Rolhauser is a quantitative plant ecologist whose research spans a wide range of ecological topics, from species distribution modeling and community assembly to the reclamation of forests affected by industrial activities. Over the course of his career, he has worked in diverse ecosystems across Argentina, Australia, the USA, and Canada, contributing to a deeper understanding of how plant communities respond to both natural gradients and human-induced environmental change. Andrés is also an experienced educator who has taught undergraduate and graduate courses in ecology, statistics, and environmental science at several institutions. His efforts are focused not only on advancing scientific knowledge but also on translating findings into actionable insights for industry partners and policymakers.

Enhancing Chloride Plume Resolution Through Incorporation of Soils Data – Could It Shrink Your Plume?

Within Alberta and across the oil and gas industry, there are an abundance of sites with complex chloride contamination. The most significant risk posed by chloride is to water quality. Therefore, to properly understand remediation needs at these sites, advanced management approaches such as Site-Specific Risk Assessments, which commonly requires chloride fate and transport modelling.

To create a useful groundwater transport model, it is critical to define the chloride plume in groundwater in order to predict how chloride may migrate, and to estimate future maximum concentrations. Environmental site assessments often generate far more soil quality data than groundwater quality data. To enhance the spatial resolution of the dissolved chloride plume models, soil chloride data can be used to support and supplement groundwater data. This approach requires converting soil chloride concentrations to groundwater-equivalent chloride concentrations.

To correctly undertake this conversion requires a clear understanding of what the measured soil chloride concentration—typically reported from a saturated paste extract—represents. It also requires consideration of various soil properties and environmental factors that may influence the correlation between soil and groundwater chloride concentrations.

The conversion from soil to groundwater chloride concentrations is typically based on an empirical correlation coefficient. This coefficient attempts to account for the complex chemical and physical processes controlling chloride partitioning between the soil and water. Incorrect correlation coefficients can lead to over- or underestimation of contaminant plume mass and extent. This, in turn, can misinform the conceptual site model, perceived risk evaluations, and associated remedial measures.

Several empirical models exist to support this conversion, but published literature specific to chloride correlation in saturated conditions is limited. Standard environmental site assessment programs do not commonly include analysis to characterize factors that potentially influence soil to groundwater correlation, which limits the evaluation of the significance of these factors.

Montrose evaluated the correlation between soil and groundwater chloride concentrations across multiple sites. The study found that while correlations tend to be strong on a site-specific basis, variability exists between sites. The preliminary results of the investigation suggest that correlation coefficients are more accurate when key factors that aren't commonly evaluated are considered.

Even in simple scenarios, incorrect estimates of what concentrations in soil samples may imply for the risk to groundwater can lead to unnecessary or inadequate remediation. This risk may be mitigated by including low-cost analysis for easily measured soil parameters in standard Phase 2 programs.

Daniel Pollard

Montrose

Daniel is a principal contaminant hydrogeologist with Montrose. He has over 20 years of technical expertise in site assessment, risk assessment, contaminated sites closure and regulatory compliance. His work in Alberta, British Columbia, and the United Kingdom has included hydrogeological, geochemical, and contamination assessment and has spanned industry sectors.

His primary focus is the use of geological, hydrogeological and geochemical principals to consider chemical fate and transport when developing conceptual site models and risk-based remediation objectives. Daniel has contributed to the development of operational policies for the AER and supported development of regulatory instruments.

Ashley Morgan

Montrose

Ms. Morgan is a senior hydrogeologist and Professional Geoscientist in Alberta and Saskatchewan with Montrose, based in Calgary, AB. Ms. Morgan manages and provides technical assistance to complex sites within Western Canada. She has over 14 years of experience with a focus in contaminant hydrogeology. She has extensive field and officebased experience, with an emphasis on assessment and remediation of impacted soils and groundwater. Ms. Morgan has provided technical support or managed sites ranging in complexity and size from wellsite with shallow localized impacts to domestic use aquifer impacted sites spanning multiple LSDs. She has managed remediation programs based on Tier 1or 2 guidelines, Subsoil Salinity Tool, and risk-based approaches including site-specific risk assessments within Alberta and Saskatchewan.