

Closure Options for Organic Soils: Analytical Results Interpretation for Peat Material

Mallika Senevirathna, North Shore Environmental Consultants Inc.

Peat is characterized as highly organic soil containing a heterogeneous mixture of decomposed plant material that has accumulated in a saturated anaerobic environment. Canada contains approximately 25% of the world's peatlands, which covers about 12% of the surface area. It is common to find areas with high amounts of peat in Alberta and British Columbia that will interfere with intrusive environmental site investigations.

Mineral soils generally consists of 1 to 6% organic matter with 10 to 50% moisture content while peat consists of greater than 40% organic matter content with moisture contents greater than 50%. Laboratory analytical methods and the remediation guidelines that are currently available for environmental investigations are developed for the assessment and remediation of mineral soils; therefore, comparison of analytical data in peat to standard numerical guidelines requires professional judgement and scientific justifications due to the differences in physical characteristics of peat and mineral soil.

The factors that will complicate the comparison of analytical data from peat to standard numerical guidelines are the presence of high moisture content, high organic matter content, and high water absorption capacity. The high moisture content with elevated organic matter content in peat can cause low concentrations of contaminants to appear higher in peat material than in mineral soils. Currently, various scientific methods are used for the interpretation of analytical results in peat material. These methods include the use of wet-weight concentrations instead of laboratory measured dry-weight concentrations, use of chromatograms to differentiate biogenic and petrogenic effects combined with silica-gel clean up to remove biogenic interferences and use of background data for comparison.

This presentation will discuss various scientific methods that were used for the interpretation of analytical data in peat material for the assessment of contamination of hydrocarbons, metals, and methanol identified at a number oil and gas sites located in British Columbia.

Mallika Senevirathna

Dr. Senevirathna has over 15 years of experience working in the environmental industry as a technical specialist. Majority of Dr. Senevirathna's experience consists of providing technical guidance for assessment and remediation of contaminated sites, analysing and interpretation of field and analytical data, and development of Tier 2 site specific guidelines (including the Sub Soil Salinity Tool), Conceptual Site Models (CSMs), Remedial Action Plans (RAP), and Risk Management Plans (RMPs) for various soil and groundwater contaminated sites. As a Senior Technical Reviewer, Dr. Senevirathna is responsible for providing technical support and senior report review for complex projects and also providing mentorship and training of junior staff.