

Salinity Analytical Method Review for Characterization in Muskeg



Project Profile

Muskeg, or peat, is currently classified as a soil under the BC regulatory regime. SynergyAspen, working with Maxxam Analytics and CARO Analytical Services, attempted to review and develop a more accurate method of testing and measuring the concentration of sodium and chloride (salt) in Muskeg.

SynergyAspen applied for and obtained funding from the BC Oil and Gas Research and Innovation Society to complete a review of the analytical method used to determine sodium and chloride concentrations in Muskeg.

Issue

Although muskeg is treated as a soil from a regulatory perspective, muskeg behaves more like a sponge, as it behaves as a combination of soil and water. This makes testing methodologies based on a soil medium less accurate, variable and highly biased. This testing inaccuracy results in unnecessary delineation and excavation of muskeg falsely identified as contaminated.

Since a total of 11% of Canada's surface area is covered by peat, versus 9% covered by water bodies, developing accurate testing for the specifics of this fragile ecosystem is an essential part of environmentally sound and scientifically based testing and regulatory practice.

Solution

In order to determine the most accurate and consistent methodologies for measuring the sodium and chloride levels in water, SynergyAspen created the following situation:

1. Create sixteen 'spiked' muskeg samples, each with a known saline concentration and water content.
2. Measure each sample using three methods¹:
 - a. Standard Saturated Paste Method (The method currently used by industry)
 - b. Squeeze and Analyse Method
 - c. Intentionally Oversaturation Method (SynergyAspen Scientists developed this method specifically for this project)
3. We analysed each method for percent recovered (compared to the known result) and effectiveness (using the range and standard deviation from the known result.)

Outcome

We determined that the Intentionally Oversaturation Method provided the most accurate (as measured by percent recovery) and effective (measured by range against the known quantity). With this accuracy, SynergyAspen believes that there are enormous benefits to the upstream Oil and Gas industry, not only in cost savings by reducing the amount of muskeg being unnecessarily remediated without compromising environmental integrity, but also by preserving the natural muskeg setting which takes thousands of years to generate.

¹ More details are available by reading the entire report. This is found at <http://www.bcogris.ca/projects/complete>