Understanding Characterizing the Influence of Clay Pads on Toluene Biogenesis in Peatlands

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Toluene, an Alberta Tier 1 contaminant, has recently garnered attention from the petroleum and environmental industries. Elevated levels of toluene are frequently found under clay pads that support petroleum infrastructure in peatlands in Northern Alberta. These elevated toluene levels do not always follow patterns typical of petrogenic toluene. Additionally, there is scientific evidence that toluene can be produced biogenically under colder, anaerobic conditions, similar to those found at the clay pad sites. Solstice employed several statistical methods to evaluate the relationships between toluene and salinity parameters and site characteristics. The results of this analysis were synthesized with current scientific knowledge to create two toluene cycle schematics, one for sites capped with a well pad and one for uncapped sites in the study.

Our study concluded that the clay pads appear to promote the production and accumulation of toluene. Potential mechanisms for this observation, identified through literature review, include increased supply of sulphate for anaerobic respiration and simultaneous blocking of oxygen from entering, and toluene from exiting the peatland system.

Final Report