New methods to More Accurately Quantify Hydrocarbon Contamination from Natural Background

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Examination of hydrocarbon contaminated environmental sites by traditional gas chromatographic (GC) methods reveals that natural background hydrocarbon signals often interfere with signals from petroleum or anthropogenic sources suggesting anthropogenic contamination may be greater than in actuality. In some cases, such as peatlands and other boreal forest environments, the natural (biogenic) hydrocarbon signal may exceed regulatory guidelines even without additional anthropogenic materials present. Traditional single-dimensional gas chromatography, used as the current standard prescribed method does not accurately allow for the quantifiable differentiation of biogenic inputs from anthropogenic ones. This may result in potential mitigations being implemented on uncontaminated or marginally contaminated sites, unnecessarily disturbing the natural environment.

To overcome the limitations of traditional GC, two-dimensional gas chromatography (GCxGC) can be used resolve petrogenic and biogenic compounds, enabling unambiguous group quantitation of both. We will present data from case studies showing the amount of mixing of petrogenic and biogenic compounds using traditional methods such as silica gel removal, environmental subtraction and biogenic interference calculation (BIC) versus GCxGC.

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Anthony Aquino graduated from St. Francis Xavier University with a Bachelor of Science in Chemistry in 2017. He then completed a Master's degree in Forensic Science, specializing in Forensic Chemistry, at the University of Strathclyde in 2018. He was hired by AGAT Laboratories in September 2019 to work in their Forensics Division and in particular to develop their two-dimensional gas chromatography technology. He was been with the company for a year and a half and with this presentation will showcase one of the most interesting and exciting areas of development with this technology.