

Soil Gas Hydrocarbons: A Dual Purpose Geochemistry that Locates REDOX Cells and Identifies Specific Organic Signatures in Petroleum Exploration, Dale A. Sutherland, Activation Laboratories Ltd., 1336 Sandhill Dr., Ancaster, ON L9G 4V5, dalesutherland@actlabsint.com

Soil gas hydrocarbons (SGH) is an extractive procedure which releases organic compounds adsorbed on surficial samples such as soil, peat, humus, and lake-bottom sediments. These samples act as long-term collectors of organic compounds that migrate to the surface from deep hydrocarbon based plays. SGH has been researched and developed for over 10 years and analyzes for hydrocarbons in the C5–C18 range. These hydrocarbons are very robust to sampling, shipping, and handling procedures. Analysis of the sample extracts with gas chromatography–mass spectrometry provides a highly selective and sensitive method with detection limits in the trace parts-per-trillion (ppt) range for over 160 specific hydrocarbons.

Geochemical anomalies of hydrocarbons over petroleum bodies have been noted in the literature for several decades. These anomalies arise from oxidation-reduction (REDOX) cells that can be found for both hydrocarbon and mineral bodies. Researchers also suggest that hydrocarbons migrate as micro-gas bubbles through thousands of metres of cover, as seen with SGH case studies. SGH has the ability to vector to the vertical projection of a target as well as identify the type of buried target present by using forensically determined hydrocarbon signatures. Survey results are typically very clean, with easily interpretable anomalies.

SGH surveys have been conducted over several petroleum fields in southwestern Ontario and southeastern Saskatchewan, Canada, having depth to the play at up to 10,000 feet. Some case studies will be shown in this presentation.