



Defining Geogenic Background for Site Investigations – Combining Petroleum Forensic Chemistry and Geology

Phil Richards, Matrix Solutions Inc

Within the Peace River area of northwest AB and northeast BC, and across the Clear Hills and Halverson Ridge, soil can present detection of PHCs, notably BTEX and PAHs that have a geological origin. These should be considered as part of the natural condition for the area. However, these may also represent Chemicals of Concern as part of site assessments. Forensic methods can be applied for distinguishing natural sources from potential anthropogenic impacts to support site investigation conclusions.

This presentation uses data from multiple sites in the area of interest to show a methodology for determining the source characteristics of these PHCs, and how they relate to an original bedrock source. This uses petroleum geochemistry to describe the depositional characteristics for PHCs as well as how that relates to subsequent quaternary geological mechanisms. The data interpretation develops lines of evidence to clearly distinguish natural and anthropogenic sources.

Those involved in site investigations within this area of the Western Canadian Sedimentary Basin will find this information directly applicable. The methodologies described in the presentation are also pertinent to similar types of investigations within other areas where natural sources, particularly those of geological origin, may be encountered.

Phil Richards

Dr. Richards is a chartered senior forensic chemist with over 20 years of experience as a professional chemist, and has trained and worked as an environmental forensic chemist, an industrial process chemist and a research pure chemist. He is qualified as an expert as an analytical chemist at the Court of the Kings Bench in Alberta. He specialises in chemical data interpretation, in particular by the application of chemical fingerprinting and chemical statistics relating to environmental samples and using chemical data to determine the nature of sources for observed chemistry. He also specializes in weathering studies, fate and transport assessments and guideline modification relating to complex natural background.

Throughout his career, Dr. Richards has carried out research in the preparation, defense and opposition of numerous patents, as well as the preparation of other peer-reviewed scientific publications in environmental, forensic and industrial disciplines.