



Methanol - Now You See It, Now You Don't

Anthony Knafla, Equilibrium Environmental Inc

Methanol is an important process chemical used in the upstream oil and gas industry. Investigations at contaminated sites often involve analyses for methanol and remediation efforts and expenditures can result due to areas and depths where concentrations exceed Alberta Tier 1 guidelines. Formaldehyde analyses are also required where methanol impacts are present, and are compared against the Alberta 2010 quasi-Tier 1 guideline. The physical chemical properties of methanol indicate that it prefers the water phase and has little interest in air and soil phases. This is why methanol impacts cannot be readily identified during drilling activities based on typical field screening equipment used in the industry (PID, OVA, FID) that is geared towards volatiles. Due to physical/chemical properties and biodegradation potential, methanol plumes can extend further than benzene plumes at oil and gas impacted sites. Methanol is also a co-solvent, increasing the solubility and transport potential of heavier hydrocarbon fractions leading to larger impact footprints. Work at multiple oil and gas contaminated sites involving detailed chemistry analyses has identified conflicting and confusing methanol results that suggest caution must be taken when interpreting data and exceedances to drive remediation. The results were conflicting to the extent that a site could be identified as requiring remediation for methanol and millions of dollars' worth of remediation expenditure to no exceedances, no expenditure or remediation required. This was determined from duplicate sample batch submissions, multiple analytical techniques, and comparisons of soil and groundwater data from identical locations. The path of methanol contaminated site characterization is fraught with many risks for mis-characterization in the field, in the lab, and due to the presence of other substances that may mask as methanol in traditional analytical packages. Results from case studies will be presented involving multiple analytical techniques, multi-media analyses, sources of cross contamination, procedures to help resolve, as well as an innovative low cost field screening technique that can be applied to soil and groundwater samples.

Anthony Knafla

Mr. Knafla, M.Sc., DABT, P.Biol, QP, is a senior scientist with 33 years of experience in the fields of toxicology, risk assessment, environmental fate and transport modelling, analytical techniques, risk management, regulatory liaison, public communication, and remediation innovation. He has completed multiple aspects of human health and ecological risk assessments(toxicology, fate and transport modeling, kinetic modelling, etc), for hundreds of projects pertaining to various sources of environmental impact. Mr. Knafla is a Biochemist and Medical Scientist, as well as professional biologist (ASPB) and board certified toxicologist (Diplomate of the American Board of Toxicology). He has provided expert testimony in public hearings and expert peer review services related to toxicology, chemical fate and transport, and risk assessment. Mr. Knafla innovated the Subsoil Salinity Tool (SST) software tool for assessing salt contaminated sites and currently is working on a similar tool for fertilizer impacts (Fertilizer Guideline Calculator, FGC) and surface casing vent flows as well as gas migration at abandoned wells. Mr. Knafla founded Equilibrium Environmental Inc. in 1999, a company composed of approximately 30 staff.