Understanding the Relationship Between Key Water Quality Parameters and the Behavior of Sulfolane In Groundwater

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The mobility and behavior of sulfolane within groundwater as related to geochemical conditions is poorly understood. General parameters such as chemical oxygen demand (COD) and sulfate (SO4) have been often used as indicators for the presence of contaminants, however these parameters are often influenced by other constituents such as organic contaminants and site operations. To determine the impact of groundwater constituents on sulfolane behavior a series of experiments were conducted, measuring key water quality parameters in different water matrixes. Water matrixes that were used for the experiments were distilled water (DI), synthetic groundwater, and sampled environmental ground water. Synthetic groundwater was created to represent typical groundwater found on impacted sites with a focus on inorganics whereas the sampled ground water focused on organics and other constituents such as bacteria. Conducting such experiments in a step-wise approach using three increasingly complex sample matrix allowed a more comprehensive analysis of sulfolane behavior in a controlled setting. Through this study we were better able to determine the relationship between routinely monitored parameters and sulfolane concentrations.

Deanna Cottrell, PChem

Ms. Deanna Cottrell is a registered Professional Chemist with over 20 years of experience in the environmental field. Currently working for Shell Canada as the Water /Groundwater Subject Matter Expert for Upstream Canada; Deanna is actively involved in Alberta’s water community as Co-chair of both the CAPP Water Task Group and as a Director on the Alberta Water Council. Deanna is also an active participant in the Mighty Peace WPAC, the Northeast BC Water Strategy Steering Committee, the Northeast BC Water Strategy Technical Committee, and COSIA Groundwater Monitoring Committee.

Ms. Cottrell has expertise with managing specialized environmental projects, including biodiversity inventories, forensic chemical investigations, waste treatment and management, spill response for petroleum releases, construction monitoring programs, environmental monitoring for foreshore projects, risk assessments for water and soil vapour as well as water sourcing projects. Specific projects have included development of sustainable development decision making matrix for site redevelopment option evaluation, site-specific liability assessments for various upstream and downstream petroleum sites, groundwater assessment programs for large petrochemical facilities, hydrological assessments for industrial development including wetland classification.

In her current role, Deanna is responsible for development and implementation of water related strategy in compliance with all local, provincial and federal requirements as well as Shell’s internal best practices for Unconventional, Heavy Oil and In-situ developments in Canada. This work is supported by her extensive knowledge of current and emerging environmental regulations in BC, Alberta, Saskatchewan, Manitoba and NWT.

Paul Westlund, PhD

Dr. Paul Westlund is an expert in the field of contaminants of emerging concern with a focus on water management, water/wastewater treatment technologies and water quality monitoring. His experience includes designing and managing wastewater treatment facilities and conducting environmental assessments located in South America, Middle East and North America. Dr. Westlund has published peer reviewed papers in the areas of advanced oxidation technologies, environmental risks of treated industrial effluent and analytical chemistry. Dr. Westlund is currently part of Shell’s sulfolane management group and is focused on R&D initiatives and remedial strategies for impacted sites.