

Remediation of Groundwater Impacted with NAPL

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The remediation of groundwater impacted by NAPL is of public interest and remains a significant challenge facing many industrial sectors in Alberta and around the world. NAPL constituents are hazardous compounds which have been shown to be toxic, mutagenic and/or carcinogenic. All sorbate-sorbent systems yielded the S-type isotherms. Sorption of the sorbates on representative core samples retrieved from the site could be best described mathematically by the Freundlich than the Langmuir sorption model. K_d values derived at 6 °C ranged from 3.05 to 0.89 L/kg. Chemical degradation of DNAPL constituents could be best fitted to a first-order kinetic with a three hour optimum reaction time. The results also indicated that UV radiation combined with ClO_2 can be an effective method for chemically degrading PAH, PCB-S, SVPHEN-S, F24FIDE-S and BTEXHSAB-S contaminants. Under the most efficient treatment system, 76 to 98% of the chemicals of concern were destroyed. Calculated travel time for potential off site migration ranged from 150 to 80,817 years. Bench-scale of fluorescein as an applied tracer was also investigated. A pilot testing program is currently under way to test this innovative treatment technology. If successful, this approach represents a quick and cost effective approach to groundwater remediation.

Biography:

Roger Saint-Fort has completed his Ph. D in the University of Nebraska; M. Sc., University Laval; B. Sc. University of Manitoba Roger Saint-Fort, Ph.D., P.Ag., My current research activities investigate chemical and electrochemical innovative approaches for remediating NAPL contaminated groundwater, use of surfactant to enhance soil bioremediation, landfill leachate treatment, application of electro - coagulation- ClO_2 and nano bubble technology to reclaim industrial wastewater streams. The last few years, I have been working passionately and successfully on developing, prototyping and implementing innovative water treatment systems in order to bring sustainable drinking water to remote and economically challenged communities around the world.