

# **GSE - February 6, 2003 Talk**

TOPIC: In-Situ Chemical Oxidation of Petroleum Hydrocarbons: A Case Study  
PRESENTATION BY: Anjum Mullick, Nichols Environmental (Canada) Ltd.

A heating oil plume (C10 to C50 hydrocarbons) stemming from leaking underground and above ground storage tanks at an airport in northern Quebec had caused widespread contamination. The groundwater plume had migrated underneath two of the airport's buildings and covered an approximate area of 3,300 m<sup>2</sup>, which extended from surface to a depth of approximately 3.0 m. Dissolved C10 to C50 hydrocarbon concentrations were as high as 75 ppm, while the remediation guideline was 3.5 ppm. The geology consisted of a sand and gravel fill, underlain by approximately 2.0 m of sand followed by clay. The water table was at a depth of approximately 1.4 m. Excavation and ex-situ treatment was too costly to remediate the plume and in-situ methods such as soil vapour extraction, sparging or dual-phase extraction could not remediate the plume within a short time frame. Based on low cost and high probability of potential success, in-situ chemical oxidation using hydrogen peroxide was used to treat the petroleum hydrocarbon groundwater plume. Diluted hydrogen peroxide was delivered into the plume via stainless steel lances. Injection points were set out in a 6m grid spacing. After injecting a total of 60,000 litres of hydrogen peroxide into the formation, the plume was remediated with dissolved C10 to C50 hydrocarbon concentrations reduced to as low as 0.0005 ppm. The presentation will discuss the in-situ chemical oxidation technique implemented on the site, analytical results and the cost-effectiveness of this technology compared to other remediation technologies.

Ms. Anjum Mullick completed her B.A.Sc. (1997) in Civil Engineering from the University of Waterloo and a M.Sc. (1999) in Civil and Environmental Engineering from the University of Alberta. Following the completion of her M.Sc., Ms. Mullick joined Nichols Environmental as an environmental engineer. Ms. Mullick's experience at Nichols Environmental includes responsibility for researching innovative remediation technologies, including in-situ chemical redox manipulation. Ms. Mullick is also currently a member of the GSE Executive.

Venue: University of Alberta Faculty Club (116th Street and Saskatchewan Drive)

Time: Cocktails: 5:30 PM, Dinner: 6:00 PM Presentation: 7:00 PM

Date: Thursday February 6th, 2003

Cost: GSE Members: \$17, Non-Members: \$22, Students: \$12