

Case Study

Surfactant Enhanced Ex-situ Bioremediation of Oil & Gas Pipeline Spill Soil

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Platform Presentation

This paper will focus on the application of non-ionic surfactants to improve the “bio-availability” of higher molecular weight (HMW) compounds such as those present in F1, F2, F3 and F4 petroleum hydrocarbons. This process is called Surfactant Enhanced Bioremediation (SEB) and this paper presents a western Canadian case study using SEB for the remediation of soils contaminated from a pipeline spill event.

During the past decade, much discussion has centered on the unavailability of absorbed compounds to soil microorganisms. It is generally now assumed that desorption and diffusion of bound contaminants to the aqueous phase is required for microbial degradation (W.P. Inskeep, J.M. Wraith, C.G. Johnston, Hazardous Substance Research Center, 2005).

It had been well established in literature that greater than 90% of LNAPL and DNAPL contaminants prefer to attach (i.e., absorbed or adsorbed) onto surfaces such as soil and bedrock, versus being in the dissolved water-phase. The sorption of contaminants to soil substrates is considered the principal limiting factor that negatively affects bioremediation technologies as the contaminants are not “bio-available”. The SEB process desorbs sorbed contaminants making many seemingly recalcitrant compounds more ‘bio-available’ for improved microbial mineralization during in-situ and/or ex-situ bioremediation.

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