Carbon Dioxide Traps Used to Measure Microbial LNAPL Degradation

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ABSTRACT

Traditional LNAPL remedies (e.g. hydraulic LNAPL recovery) are often costly and have limited effectiveness. Recent studies have indicated that natural losses of LNAPL can help to stabilize and even shrink subsurface LNAPL bodies once the LNAPL source is removed. Developing an effective understanding of natural losses of LNAPL is an important step in establishing LNAPL management strategies. Estimated rates of natural losses of LNAPL can be used to demonstrate stability, form a basis to initiate or discontinue hydraulic recovery, estimate plume longevity, and as a benchmark to compare relative effectiveness of different remedial alternatives. Natural Source Zone Depletion (NSZD) is the reduction in LNAPL mass that occurs in situ through a combination of naturally occurring processes, including dissolution, volatilization, and biodegradation. When LNAPL degrades in the vadose zone, microbes anaerobically convert petroleum compounds to methane, and then methane further breaks down to carbon dioxide. Carbon dioxide traps installed at the surface above LNAPL plumes has emerged as a new technique to assess NSZD. This presentation will introduce the application of carbon traps for use in determining NSZD effectiveness, discuss the benefits, limitations and challenges of using the technique, outline the installation and monitoring protocols, and present the results and interpretation from a NYSDEC approved project in which these traps were used to assess remedial performance.

BIOGRAPHY

Ian Holst, Project Engineer at Roux Associates, has 6 years of experience managing large petroleum remediation projects. Ian has a B.S. in Biological Engineering from Cornell University. Beyond management, Ian is active in evaluating alternative approaches to free-product recovery including the use of water-flooding and vacuum-enhanced technologies. Ian is also experienced in using transmissivity and risk-based metrics in the development of recovery endpoints to meet remedial goals.