

## Combined Remedy Using In Situ Chemical Oxidation at a Former Wood Treating Site, United Kingdom

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**Background/Objectives.** This paper will present the results of a Base-Catalyzed Persulfate (BCP) injection program completed at a former wood treating Site in the United Kingdom. The ISCO treatment zones were defined using via high-resolution site characterization (HRSC) using a *Modified Waterloo Profiler*.

Subsurface geology consists of high permeability fluvial sand and gravels overlying Chalk. The principal contaminant of concern was dieldrin, with concentrations of petroleum hydrocarbons (TPH and aliphatic and aromatic fuel oil fractions) and lesser concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX) also present.

**Approach/Activities.** A laboratory scale bench test was completed to confirm oxidation of dieldrin and TPH. ISCO was then applied within two treatment zones, located upgradient and downgradient respectively, of a major source area that was treated via thermally enhanced dual phase extraction. ISCO was selected in these areas due to a lower contaminant mass relative to the adjacent source zone areas, to provide treatment supporting the active source zone remediation and to afford sustainable treatment as part of a combined remedy to meet overall project goals in a timely and cost-effective manner.

BCP was prepared using an automated mixing trailer and applied to the subsurface using concurrent gravity injection in multiple locations, providing > 90 cubic meters of BCP in the target areas over several weeks of application. This approach was selected to focus the treatment in the upper portion of the soil column where the residual concentrations were highest and minimize the overall increase in the groundwater table. Periodic geochemistry and confirmatory groundwater samples were collected in multiple vertical intervals in monitoring and injection wells throughout the injection program to evaluate the real-time performance of the program.

**Results/Lessons Learned.** This paper will discuss the success of the dieldrin oxidation, overall injection approach and optimizations completed, as well as data interpretation on the major flow paths, geochemical signatures and illustrative performance data on TPH reduction gleaned from the monitoring conducted.