Use of Innovative Remedial Action Evaluation Tools Leads to Shut Down of Groundwater Extraction and Treatment System

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Between 2006 and 2007, Union Pacific Railroad implemented remedial measures at the Portola CA Former Fueling Facility to protect the Feather River. Two areas of affected soil near the river were excavated, and a cutoff wall and groundwater extraction and treatment system (GETS) were installed upgradient of these areas to intercept and remove LNAPL to mitigate possible transport toward the Feather River.

Installed as an interim measure, a Corrective Action Plan was submitted in 2009 to evaluate and recommend a final remedy for the site to the California Regional Water Quality Control Board (Board). The Board's criteria for remedy selection is based on technical feasibility, overall effectiveness, time to reach cleanup levels and cost.

Several remedial evaluation tools were used in the analysis:

- LNAPL Distribution and Recovery Modeling - used to determine what portion of the LNAPL behind the cutoff wall was recoverable
- BIOSCREEN - used to determine the attenuation rate of dissolved hydrocarbons and whether migration of the dissolve phase to the Feather River could occur
- Source Zone Dissolution and Intrinsic Bioremediation Modeling (Time to Clean Up Modeling) - used the output from the first two to estimate the time to meet cleanup levels upgradient and downgradient of the cutoff wall

Based on the results, it was demonstrated that the LNAPL at the site was only 15 percent recoverable, the limited dissolved plume attenuated before it reached the river and because of the mass of degraded heavy end hydrocarbons in the soil and the lack of access to these soils, groundwater restoration in the source areas was not technically feasible. It also demonstrated that the excavations near the river achieved what was technically feasible for restoring groundwater quality near the river.

This work demonstrated that continued groundwater extraction was not warranted. However, high groundwater levels during the Spring could overtop the cutoff wall and, if pockets of mobile LNAPL migrated, they could affect the cleanup time downgradient of the cutoff wall. A passive remedy to place an adsorptive bed of oleophilic clay along the top of the wall was approved by the Board in March 2011.

This presentation will review how the three tools were used to evaluate potential remedies and how the recommended remedy was justified. The remedy is currently in detailed design with planned implementation in Summer/Fall 2011. Information on life-cycle cost savings and cost avoidance will be presented.