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## Groundwater and soil vapor monitoring and remediation of a PCE-impact drycleaner (Alhambra, California)

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Lindmark Engineering was retained by a property owner of a drycleaner located within the southwestern portion of the San Gabriel Valley Area 3 Superfund site. The site was previously identified in an EPA-conducted remedial investigation as a potential source area for perchloroethylene (PCE). Previous consultants had conducted soil, groundwater, and soil-vapor assessments, as well as a soil-vapor extraction pilot test that had been approved by the Regional Water Quality Control Board (RWQCB). When we became the consultant for the site, we installed two additional groundwater monitoring wells with the purpose to determine the groundwater gradient and flow direction, and we installed a double-nested vapor extraction well to enhance the proposed additional soil-vapor extraction pilot test. During well installation, we found evidence that a seismic fault likely causes a groundwater discontinuity between well locations, and therefore a groundwater gradient could not be established.

In order to help determine the groundwater gradient, we proposed and conducted a borescope groundwater survey, which involved deploying a down-hole camera into the well screen. The camera recorded and captured particulate velocity and direction in the water column, which was used to determine the groundwater flow direction. The results of the survey helped to determine contaminant fate and transport at the site without the need for installing costly additional groundwater wells.

We also conducted a one-month pilot test of the soil vapor extraction system at the site. The results of the test allowed us to determine the radius of influence and effectiveness of soil vapor extraction. Based on the results of the pilot test, we prepared a remedial action plan for remediation of the PCE in soil vapor, using vapor extraction. During the implementation of remediation, PCE-impacted soil beneath the building was excavated to reduce the time of vapor extraction. The vapor extraction system operated an effective time of twelve months and recovered approximately 190 pounds of PCE.

Based on the results of a six-month rebound test, including soil and soil vapor verification sampling, the RWQCB issued a no-further action letter with a deed restriction.

For more information on this project, please contact Lindmark Engineering at (818) 707-6100 or [ulf.lindmark@efiglobal.com](mailto:ulf.lindmark@efiglobal.com).