CASE HISTORY©

Work Summary (Site History) ***CHS-0008 Chlorinated Compounds(TCA- DCA- DCA)***

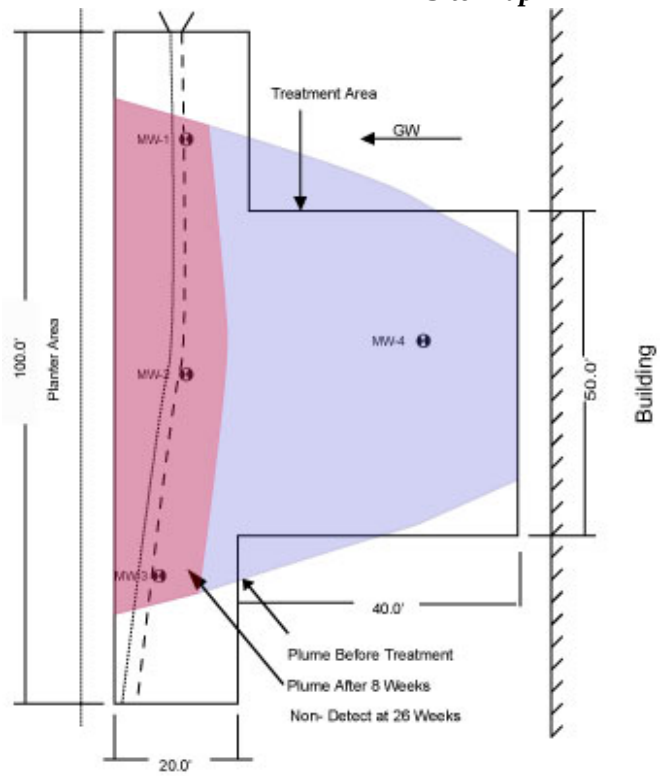
The sale of an industrial property was being held up because a groundwater plume contaminated with chlorinated VOCs required remediation. Compounding the problem was the specter that the plume was poised to migrate off-site. Because underground electrical cables were located in the plume, care had to be taken so that these utilities would be protected from physical and corrosive damage by any remedial process. Conventional technology such as SVE was ruled out because the plume was located in a wet, dense-clay strata 12 to 22 fbgs. Because of the consultants enjoyed success at treating vinyl chloride and DCE at a previous site, an in-situ chemical oxidation (ISCO) process based upon the controlled long-term in-situ generation of hydrogen peroxide was selected. The work was successful and the site was closed.

Project at a Glance

Site 0008 - Site Information

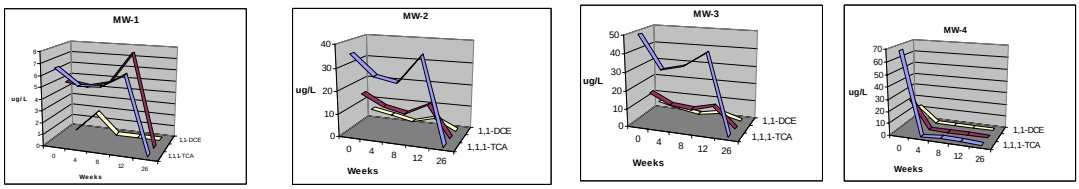
Type of site	Industrial Park
Contaminants	1,1,1-TCA, 1,1-DCA, 1,1-DCE
Work Scope	Inject chemox reagent
Media Treated	Groundwater
Soil Type	Wet Clay
Groundwater Depth	12 feet
Remedial Objective	Reduce contaminants to levels < MCLs

Site Map



Site 0008 - Application Information

Technology Selected	ISCO
Application Method	DPT Probe
Area Treated	4,000 sf
Vertical Interval	12 to 22 fbgs
Injection Point (IP) Spacing	5 feet
Media Volume Treated	1,480 cubic yards
Number of Injection Points	160
Oxidizer Volume	13,320 pounds
Oxidizer per IP	~83 pounds
Oxidizer per cubic yard	~9 pounds
Time to Complete	12 days



Current Status

Closed! A NFA letter was issued by the State of California

Results

Site 0008- Contaminant Data

Well	Week	Contaminants of Concern (µg/L)		
		1,1,1-TCA	1,1-DCA	1,1-DCE
MW-1	0	6.6	5.0	ND
	4	5.2	4.7	1.8
	8	5.3	5.2	ND
	12	6.4	7.8	ND
	26	**ND**	**ND**	**ND**
MW-2	0	36.0	16.0	5.9
	4	27.0	11.0	4.1
	8	25.0	8.9	2.1
	12	37.0	14.0	4.7
	26	**ND**	**ND**	**ND**
MW-3	0	50.0	15.0	6.1
	4	32.0	9.1	3.5
	8	35.0	8.0	1.3
	12	43.0	11.0	3.4
	26	**ND**	**ND**	**ND**
MW-4	0	68.7	24.4	13.4
	4	ND	ND	ND
	8	1.2	ND	ND
	12	0.9	ND	ND
	26	**ND**	**ND**	**ND**

Examination of the data collected approximately one month after the injection work was completed revealed that little or no change had occurred in the concentrations of the contaminants in monitoring wells MW-1, MW-2 and MW-3. However, dramatic reductions were observed in MW-4. Comparison of this data to previously treated sites impacted with the same contaminants, indicated that the expected results should have duplicated the reductions found in MW-4.

Review of Site Map shows an underground electrical utility corridor traversing the length of the injection area nearest the property line. It also reveals that monitoring wells MW-1, MW-2 and MW-3 are located in this corridor. During the injection work care was taken not to impact the underground electrical cables with the direct push equipment. Consequently, the two (2) rows of injection points on either side of the utility corridor were shifted away from the electrical lines to accommodate safety concerns. This inadvertently left the monitoring wells located in the utility corridor in an area not immediately impacted by the reagent. It was decided that because the groundwater was flowing perpendicular to the corridor, the reagent should eventually reach these monitoring wells. Data collected approximately six (6) months after the application indicated that the concentrations of contaminants in the wells had dropped below maximum contaminant levels (MCLs) for site closure.