

Drycleaner Site Profiles

Aiea Laundry, Naval Station Pearl Harbor, HI

Site Description

The laundry was built in the early 1940s, and drycleaning operations were conducted from the early 1950s to 1998. Various drycleaning solvents and diesel fuel were used and stored in four underground storage tanks. The western portion of the site consists of asphalt pavement, the foundation slabs from the former laundry/drycleaning building, and a former boiler house. The eastern portion consists of an open, grassy area with two smaller laundry-related storage buildings. The site is currently vacant.

Site Hydrogeology

Depth to ground water: Roughly 40 ft.

Lithology/subsurface geology: Two different ground-water regimes (basal basalt and caprock aquifers) exist at the site. In the laundry area, the depth to the caprock aquifer is approximately 60 ft bgs while the confined basal aquifer is encountered at depths exceeding 100 bgs. In an adjacent area, there are no saturated caprock sediments and the basal aquifer is unconfined. The depth to the basal aquifer in this area is roughly 40 ft. There is an upward hydraulic gradient from the basal aquifer to the caprock aquifer.

Conductivity: Two aquifers underlay the site, the unconfined, in weathered basalt and the other, deeper and sometimes confined, in fractured tuff/basalt. In some areas, the shallow, unconfined aquifer doesn't exist. Under these conditions conductivity measurements would provide very little useful information.

Gradient: See above.

Groundwater Contamination

DNAPLs Present: No

Contaminants present: Diesel fuel from a leaking UST and drycleaning solvents. The diesel fuel is found in a floating layer on the water table.

Highest contaminant concentrations: 0.546 mg/L (PCE).

Deepest significant ground-water contamination: Unknown

Plume size: A plume was not delineated.

Soil Contamination

Contaminants present: PCE, TCE, cis-1,2-DCE and vinyl chloride as well as PAHs.

Highest contaminant concentrations N/A

Description of Remediation Scenario

Cleanup Goals: To prevent further migration of VOCs in soils through the subsurface and to remove them so that they do not exceed USEPA target risk range.

For ground water, MCLs for VOCs since the aquifer is a potential drinking water source

Technologies Used:

Pump and Treat

Soil Vapor Extraction (SVE)

Any other technologies used: SVE was used to remediate the soils. A diesel fuel recovery system was also implemented in July 1999 primarily to prevent further migration of a floating product on the ground water surface. The Navy proposes to continue to use pump-and-treat and absorbent well socks. Monitored natural attenuation (MNA) is proposed for solvent concentrations in ground water.

Why was technology or technologies selected:

Date Implemented: SVE began operating in 1996 and was shut down in 1998 due to low levels of VOCs. The diesel recovery system was implemented in July 1999.

Final remediation design: Pump-and-treat for diesel fuel and MNA for dissolved solvents.

Results

Results achieved to date::: Soil data collected in 2000 showed the concentrations of VOCs decreased significantly and additional remediation of soil is not warranted. Approximately 272 gallons of free phase diesel (11 gallons/month) have been removed from the diesel recovery system.

Costs

Site assessment:

Design and implementation:

O&M:

Total costs (only completed sites):

Lessons Learned

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Site Specific References

Not Provided

Contacts

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Drycleaner Site Profiles

Dry Clean Inn, Lauderhill, FL

Site Description

This is an active PCE drycleaning facility that has been in operation since 1986. The facility is located in a small strip shopping center in a mixed commercial/residential setting.

Stormwater at the site is collected in catchment basins and routed to a series of French drains. Two of the catchment basins are located near the service door of the drycleaning facility.

Contaminant source areas at the site are the soils beneath the facility floor slab and contaminated sediments in the stormwater catchment basins.

Site Hydrogeology

Depth to ground water: 4 ft bgs.

Lithology/subsurface geology: fine to medium-grained sand interbedded with limestone, surface-14 ft bgs;
fine to medium-grained sand, 14-18 ft bgs;
shell hash, 18-23 ft bgs;
fine to medium-grained sand, 23-52 ft bgs;
sandy limestone, 52-71 ft bgs.

Conductivity: 103 ft/day

Gradient: 0.0024 ft/ft

Groundwater Contamination

DNAPLs Present: No

Contaminants present: PCE, TCE, cis 1,2-DCE, trans 1,2-DCE, vinyl chloride

Highest contaminant concentrations: 80.9 µg/l PCE, 61.9 µg/l TCE, 127 µg/l cis 1,2-DCE, 3.81 µg/l trans 1,2-DCE, 3.9 µg/l vinyl chloride

Deepest significant ground-water contamination: 15 ft bgs

Plume size: 40 ft x 80 ft

Soil Contamination

Contaminants present: PCE

Highest contaminant concentrations 3,200 µg/kg

42,800 µg/kg PCE in sediments in stormwater catchment basin.

Description of Remediation Scenario

Cleanup Goals: Groundwater - MCLs: PCE = 3 µg/l, TCE = 3 µg/l, cis 1,2-DCE = 70 µg/l, trans 1,2-DCE = 100 µg/l, vinyl chloride = 1 µg/l

Soils - leachability cleanup target level: PCE = 30 µg/kg

Technologies Used:

Monitored Natural Attenuation
Removal
Soil Vapor Extraction (SVE)
Carbon Adsorption

Any other technologies used:

Why was technology or technologies selected: Excavation was chosen as the most cost-effective method to remove contaminated sediments from the stormwater catchment basins. SVE was chosen to remediate contaminated soils beneath the facility floor slab due to the inaccessibility of the soils and the efficiency of SVE in removing VOCs from permeable soils. Natural attenuation was selected for the groundwater remedy due to the low contaminant concentrations present in groundwater and the evidence of active reductive dechlorination (PCE degradation products present).

Date Implemented: Excavation of contaminated sediments from stormwater catchment basins - July, 1999. SVE system startup - June 28, 2000.

Final remediation design: The SVE system utilized 2 horizontal extraction wells. One extraction well (VEW-1) was installed beneath the alley near the service door of the facility and the other well (VEW-2) was installed beneath the facility floor slab near the drycleaning machine.

Depth: VEW-1 3.5 ft bgs; VEW-2 3 ft bgs

Screen Length: wells 1 & 2 - 10 ft

Blower: Rotron 3 hp. capacity: 83 scfm at design vacuum of 34 in. w.c.

Actual Flow Rate: 83 scfm at 14.5 in. w.c.

Emissions Treatment: 2-200 lb. GAC vessels in series.

Radius of Influence: each well - 25 ft, System radius of influence - 40 ft.

Results

The system was operated for 12 months - until June 30, 2001. The system is estimated to have removed 1.46 lbs. of PCE. Confirmatory soil sampling indicated that contaminant levels in soils in contaminant source areas are below cleanup target levels.

Contaminant concentrations in groundwater were below cleanup targets in the final two monitoring events conducted in February and August of 2001. The criteria for No Further Action have been met and a Site Rehabilitation Completion Order was issued on September 19, 2001.

Costs

Site assessment: \$67,000

Design and implementation (includes contaminated sediment excavation and disposal): \$109,000

O&M: \$28,000

Groundwater Monitoring: \$19,000

System Closeout and Site Restoration: \$14,000

Total costs: \$237,000

Lessons Learned

1. Sites with shallow, low-level contaminant concentrations in groundwater and with a contaminant source area in permeable soils can be effectively remediated with SVE.
2. One of the keys to the effectiveness of the SVE system is locating extraction wells in contaminant source areas (generally beneath the facility floor slab at drycleaning facilities).

Site Specific References

Site Assessment Report - 9/97
Remedial Action Plan - 9/99
SVE System Startup Report - 8/2000
SVE O&M Reports 2000/2001
Natural Attenuation Monitoring Reports 1999-2001

Contacts

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Drycleaner Site Profiles

Former Dollar Cleaners, Lake Worth, FL

Site Description

Drycleaning using PCE was performed at this facility for less than 19 months (1986-87). The facility is located in a small strip shopping center situated in a mixed commercial/residential setting. A drainage canal is located approximately 75 feet southwest of the facility. The nearest public water supply well is located approximately 2000 feet southeast of the site.

The contaminant source area is the soils beneath the facility floor slab in the vicinity of the drycleaning machine.

Site Hydrogeology

Depth to ground water: 5 ft bgs

Lithology/subsurface geology: silty, fine to medium-grained sand with shell fragments, surface - 24 ft bgs;

Conductivity: 86.4 ft/day

Gradient: 0.0022 ft/ft

Groundwater Contamination

DNAPLs Present: No

Contaminants present: PCE, TCE, cis 1,2-DCE, trans 1,2-DCE

Highest contaminant concentrations: 19.9 µg/l PCE, 27.4 µg/l TCE, 63.7 µg/l cis 1,2-DCE, 2.6 µg/l trans 1,2-DCE

Deepest significant ground-water contamination: 12 ft bgs

Plume size: 70 ft x 120 ft

Soil Contamination

Contaminants present: PCE

Highest contaminant concentrations 190 µg/kg

Description of Remediation Scenario

Cleanup Goals: Groundwater (MCLs): PCE = 3 µg/l, TCE = 3 µg/l, cis 1,2-DCE = 70 µg/l, trans 1,2-DCE = 100 µg/l

Soil cleanup target leachability level: PCE = 30 µg/kg

Technologies Used:

Monitored Natural Attenuation
Soil Vapor Extraction (SVE)
Carbon Adsorption

Any other technologies used:

Why was technology or technologies selected: SVE is a cost-effective technology for removing VOCs from permeable unsaturated soils. Natural attenuation was selected for the groundwater remedy because contaminant concentrations were low and the presence of PCE degradation products indicated that some reductive dechlorination had occurred.

Date Implemented: December 13, 2001

Final remediation design: A total of six horizontal SVE wells were installed at the site. Three of the wells were installed beneath the facility floor slab and three wells were installed beneath the floor slab of the adjacent bay in the strip shopping center. Four vertical and one horizontal passive vapor inlet wells were installed beneath the building floor slab. Three horizontal passive vapor inlet wells were installed outside the western and northern walls of the facility. Approximately 32 tons of soil was removed during system installation.

Wells: 4-inch diameter PVC; 6 extraction wells, 4.5 foot screen length
Depth: 3 ft beneath floor slab, screen length 3ft; 4 vertical vapor inlet wells, depth 4 ft; 4 horizontal vertical passive vapor inlet wells (screen lengths 16 to 60 ft)
SVE motor: 5.0 hp. Rotron blower
Design flowrate: 85 cfm, 42-54 in. w.c.
Operational flowrate: 70-98.5 cfm, 64 in. w.c.
Radius of Influence: 25 ft
Emissions treatment: 2-500 lb. GAC vessels in series

Results

The system operated for 4 months (until April 2002). An estimated 0.4 lbs. of PCE was recovered. Confirmatory soil sampling showed that PCE contamination in soils had been reduced to below cleanup target levels. No contaminants were detected in monitor well groundwater samples in concentrations exceeded cleanup target levels during the last two monitor events conducted at the site. The remedial system was removed and a Site Rehabilitation Completion Order was issued for the site on October 25, 2002.

Costs

Site assessment: \$70,831

Design and implementation: \$134,598

O&M: \$29,910

Groundwater monitoring: \$ 4,574

Closure & site restoration: \$4,893

Total costs:

\$244,806

Lessons Learned

1. Even though drycleaning was performed for less than 19 months at this site and site assessment occurred 13 years after drycleaning operations ceased, drycleaning solvent contamination in soil and groundwater still exceeded cleanup target levels.
2. It is likely that excavation related to installation of the SVE system piping aided in remediation of PCE in soils at the site.

Site Specific References

Site Assessment Report 9/2000
Remedial Action Plan 3/2001
Remedial Action Report 12/2001
Groundwater Monitoring Reports 2001/2002

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