Drycleaner Site Profiles

Clotheshanger Cleaners (former), Tallahassee, FL

Site Description

Clotheshanger Cleaners (Clotheshanger) was a retail perchloroethylene (PCE) drycleaning business that operated from 1975 to 1990. The facility was used as a dry "drop-off" facility from 1990 to 1995. Currently, the property is leased to a pizza store. The site is located in a free-standing building in an area that has mostly retail businesses and restaurants.

Site Hydrogeology

Depth to ground water: 35 to 40 ft

Lithology/subsurface geology:
Sand and clayey sand from surface - 35 ft bgs
Underlying the water-bearing unit, at approximately 40 feet bls, is a clay unit. The water-bearing zone is discontinuous, and is absent in some areas.

Conductivity: 26.9 ft/day

Gradient: 0.0032 ft/ft

Groundwater Contamination

DNAPLs Present: Yes
Contaminants present: PCE, trichloroethene (TCE) and cis-1,2-dichloroethene (DCE), and vinyl chloride
Highest contaminant concentrations:
10,000 µg/l PCE,115 µg/l TCE, 80 µg/l DCE, 90 µg/l vinyl chloride
Deepest significant ground-water contamination:
140 ug/l PCE at 125 ft
Plume size: 300 ft x 1,200 (defined to MCLs)

Soil Contamination

Contaminants present: PCE

Highest contaminant concentrations: 4.3 mg/kg

Description of Remediation Scenario

Cleanup Goals: Groundwater-
Maximum Contaminant Levels (MCL's) - PCE=3.0 µg/l, TCE=3.0 µg/l, DCE=70 µg/l, vinyl chloride =1.0 µg/l
Soils- leachability based Cleanup Target Levels (CTLs), PCE=0.30ug/kg

Technologies Used:

Multi-phase Extraction
Monitored Natural Attenuation

Any other technologies used:

Why was technology or technologies selected:
Technologies that would address both soil and groundwater contamination were given consideration. Multi-phase extraction (MPE), specifically Two-phase extraction (TPE) was determined to be the most cost-effective technology to address both soils and groundwater. The TPE system would be capable of simultaneously extracting groundwater and vapor from the variable saturated zones. The extraction system involves the application of high vacuum on a recovery well and the surrounding formation in order to enhance liquid recovery from the well. The vacuum enhanced dewatering should provide sufficient radius of influence to establish plume control on the source area. This technology would also address soil by creating airflow through the unsaturated zone. The downgradient dissolved-phase contamination will be addressed through natural attenuation monitoring.

Date Implemented:
Pilot Test Conducted in February 2001
Start up of full-scale system in April 2002

Final remediation design: The system consists of eleven 4-inch diameter recovery wells (RW001- RW011) and one 2-inch diameter recovery well (RW012). RW001 is screened from 10-50 ft bgs, RW002-RW008 and RW012 are screened from 20-50 ft bgs, and RW009-RW011 are screened from 30-60 ft bgs.
A one-inch diameter PVC drop tube (extraction tube), 37 ft in length, was installed in each well and connected to a 1-inch diameter incompressible flex hose. The flex hose is connected to 2-inch PVC piping, which connects to the treatment trailer. The MPE equipment is housed in a fully enclosed trailer.
Influent water and vapors are passed through a moisture separator. Contaminated soil vapors pass through two 2,000-pound granulated activated carbon (GAC) adsorbors for vapor phase treatment. Treated soil vapor then pass through a 2-stage, oil-sealed liquid ring pump (LRP). The LRP is powered by a 240 volt- 3 phase 75 HP explosion proof motor. Soil vapor and oil (sealant) pass through a second moisture separator where sealant is removed from the vapor and recirculated back to the LRP. Separated soil vapors then exit the moisture separator through an oil-mist eliminator. Contaminated groundwater is pumped to a shallow tray low profile stripper. Treated water is then pumped from the air stripper through a 2-inch diameter discharge pipe equipped with a flow totalizer that monitors the volume of treated water discharged to the city's sanitary sewer.

Results

Results achieved to date::

The system has operated for approximately 10 months with six of the twelve RW operating. The total amount of groundwater pumped to date is 26,253 gallons. The approximate groundwater system flow rate is 0.04 gpm.

Groundwater concentrations for PCE in RW001, RW002 and RW003 during February 2001 were 5,880 µg/l, 2,640 µg/l and 2,660 µg/l, respectively. In February 2003, PCE concentrations in these wells were 5,570 µg/l, 8,200 µg/l and 2,040 µg/l.

The MPE system influent for groundwater at startup was 1,430 µg/l PCE. During the last quarterly sampling event in January 2003, the MPE groundwater influent was 210 µg/l PCE.

Soil vapor concentrations in RW001 at startup were 640 mg/m^3 PCE. During the last sampling event, concentrations in this well were 30.16 mg/m^3. Most of the mass being removed is from the unsaturated zone.

Costs

Site assessment:
$50,804
Design and implementation:
$38,000 (pilot study)
$9,500 (Remedial Action Plan)
$263,000 (construction)

O&M:$30,000

Total costs (only completed sites):

Lessons Learned

1. During the pilot test, the average air flow rate was 72 scfm. At startup the air flow rate was 131 scfm. Because the pilot test value was used in determining the operational parameters for the full scale MPE system and because the average air flow rate during startup was almost double that measured during the pilot test, only half of the RWs are able to operate at a time.
2. Most of the mass being removed at this site is from the unsaturated zone.
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Site Specific References

Harding ESE, Inc. Remedial Action Plan, October 2001
MACTEC Engineering and Consulting, Inc. 3rd Quarter Multi-phase Extraction System

O&M and Groundwater Monitoring Report February 2002

Contacts

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This profile last updated: March 12, 2003

Drycleaner Site Profiles

Colonial Cleaners, Tompkins County, NY

Site Description

Colonial Cleaners is a drycleaning business located about half a mile north of the Village of Lansing, NY, on Route 34 (East Shore Drive). Perchloroethylene (PCE) was used as the drycleaning solvent in the business operation. A sample taken from an on-site drinking water well confirmed PCE contamination at a level exceeding 2,000 µg/L. A neighbor's well located slightly downgradient from the property was sampled by the Tompkins County Health Department and was also found to be contaminated at 31.9 µg/L. The Village of Lansing's water supply main on East Shore Drive has been extended and connected to the affected residences. A third downgradient homeowner's well that is not currently being used for drinking water was also sampled and found to be contaminated at lower levels. Property inspections, conducted by Department of Environmental Conservation and Department of Health representatives in 1990, noted the presence of distressed vegetation in one portion of the property, and a faint odor of PCE near the building.

Site Hydrogeology

Depth to ground water: 3-4 ft bgs (just below bedrock surface)

Lithology/subsurface geology:
Topsoil, 6-12 inches bgs
Low permeability silty clay, 1-1.5 ft
Low permeability gravely silty clay, 1.5-2.5 ft
Fractured bedrock

Conductivity: not available

Gradient: not available

Groundwater Contamination

DNAPLs Present: No

Contaminants present: PCE, 1,2-dichloroethylene (1,2-DCE), trichloroethylene (TCE)

Highest contaminant concentrations: 9,600 µg/L, PCE

Deepest significant ground-water contamination: not available

Plume size: not available

Soil Contamination

Contaminants present: PCE

Highest contaminant concentrations 170 mg/kg

Description of Remediation Scenario

Cleanup Goals: 5 µg/L for water; 1.4 mg/kg for soil

Technologies Used:
Pump and Treat
Removal
Soil Vapor Extraction (SVE)

Any other technologies used:

Why was technology or technologies selected:

Date Implemented: The pump-and-treat system began operation in June 1998.

Final remediation design: This Interim Remedial Measure (IRM) involved excavation of contaminated soil, construction of a groundwater pump-and-treat system, and construction of two SVE systems. Contaminated soil was removed and placed on a liner with extraction piping within the contaminated soil. A pole barn was constructed over the treatment system. Plans call for the contaminated soil to be treated on-site with an *ex situ* SVE system. The remediated soil (after confirmatory sampling) will be left in place to become the floor of a boat storage barn. Contaminated soil beneath the drycleaning building and inaccesible for excavation, is being treated with a soil venting system that was installed beneath the building. A "no further action" ROD was issued in March 2001, but the IRM treatment systems continue to be operated.

Results

Results achieved to date::
Immediate - Extension of the water supply removed the exposure from drinking contaminated groundwater.

Soil - Approximately 230 tons of contaminated soil was removed for *ex situ* treatment.

Groundwater - In August 1998 after 2 months of operation, PCE concentrations had dropped to 64 µg/L. In February 1999, after the system had been shut down for two months, PCE concentrations had dropped to 2 µg/L, but concentrations of 1,2-DCE and TCE (breakdown products) had risen to 42 µg/L and 15 µg/L respectively. October 1999 data revealed concentrations of 100 µg/L, 140 µg/L, and 90 µg/L for PCE, 1,2-DCE, and TCE respectively. April 2000 data showed concentrations of 98 µg/L, 23 µg/L and <3 µg/L for PCE, 1,2-DCE, and TCE respectively. The system will continue to operate until contaminants all meet groundwater standards.

Costs

Site assessment: not available

Design and implementation: not available

O&M: not available

Total costs (only completed sites):

Lessons Learned

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Site Specific References

available on microfilm

1. January 1996, Focused Remedial Investigation Workplan, C&H Engineers P.C.
2. June 1997, Focused Remedial Investigation Report, C&H Engineers P.C.
3. January 1998, IRM Data Report, C&H Engineers P.C.
4. August 1998, IRM Data Report, C&H Engineers P.C.
5. February 2001, Proposed Remedial Action Plan
6. March 2001, Record of Decision and Responsiveness Summary

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This profile last updated: March 10, 2003

Drycleaner Site Profiles

Former Norge's Cleaners, Hays, KS

Site Description

The Former Norge's Cleaners was identified as the source of a perchloroethylene (PCE) release that impacted PWS wells in 1984. The facility is located in a commercial district and the contaminant plume extends beneath residential and commercial areas. Kansas Dept. of Health and Environment (KDHE) also identified contamination resulting from two downgradient drycleaners: Former Royal T Drycleaner and Former Suburban Cleaners. KDHE treated the three areas as one site, because the PCE contaminant plumes commingled. KDHE conducted site investigations in 1994-1997 and began SVE remediation in 1997 and Dual Phase Extraction in 1999. A downgradient municipal packed tower air stripper system was also installed in 1999.

Site Hydrogeology

Depth to ground water: 48 feet bgs

Lithology/subsurface geology:
Silts and clays, with interbedded sand layers, 6 inches to 3 ft in thickness to 35 ft bgs; Poorly sorted sand layer with fine to coarse gravel and caliche, 35-40 ft bgs;
Silty clay 40-57 ft bgs;
Bedrock 57 ft bgs.

Conductivity: 1.2 ft/day

Gradient: 0.03-0.075 ft/ft

Groundwater Contamination

DNAPLs Present: Yes

Contaminants present: PCE, trichloroethylene (TCE)

Highest contaminant concentrations: 3,500 mg/L (PCE), 15 mg/L (TCE)

Deepest significant ground-water contamination: 50 ft

Plume size: 1,000-2,000 ft wide and extends 1.5 miles south.

Soil Contamination

Contaminants present: PCE

Highest contaminant concentrations: 24,000 µg/kg (PCE)

Description of Remediation Scenario

Cleanup Goals: Reduce PCE groundwater contamination to below MCL of 5 mg/L; reduce soil contamination below KDHE RSK level of 180 µg/kg.

Technologies Used:
Air Stripping
Pump and Treat
Soil Vapor Extraction (SVE)

Any other technologies used: None

Why technology or technologies selected: Initial SVE system was chosen for the relatively low cost to address the high PCE concentrations in the vadose zone and presence of buildings and utilities. A dual phase extraction system was installed to enhance the SVE system by lowering the water table to pull out additional vapors via SVE. The Kansas Drycleaning Program was also able to purchase some used equipment from the Kansas LUST Program for a very reasonable cost.

Date Implemented: SVE - 1997
Dual phase Extraction - 1999

Final remediation design: SVE - four SVE wells. Dual phase extraction system - 4 groundwater extraction/SVE wells in conjunction with two of the four existing SVE wells. Each extraction well was designed to remove five gallons per minute (gpm) for treatment by a shallow tray air-stripper system. The tray stripper was designed to reduce 3,000 µg/L influent concentrations to less than 3 µg/L effluent concentration. Groundwater is treated and discharged to a sanitary sewer. Sequestering agent is used to prevent fouling.

Results

Source area: 95% reduction of PCE in groundwater monitoring wells downgradient of the remediation system. Some cross-gradient wells remain contaminated at original levels indicating some source area remains contaminated. SVE removal - 3,000+ lbs of VOCs. The shallow tray air stripper has reduced 3,300 µg/L influent concentrations to less than 3 µg/L. Over 28 lbs of VOCs has been removed from the groundwater run through the tray stripper.

Costs

Site assessment: $52,035

Design and implementation: SVE - $28,550
Dual Phase - $69,835

O&M:
SVE only - $9,573 / 7 months
Dual Phase - $45,250 / 38 months

Total costs (only completed sites):

Lessons Learned

1. Lowering of the water table allowed a much larger zone for SVE to remove soil gas vapors and greatly enhanced the SVE effectiveness.
2. Source area removal under buildings was extremely difficult to reach with SVE in silt/clays.
3. Jet pumps were used in extraction wells due to anticipated fines in the formation. Piping runs of 50-200 ft and did not work well with the jet pumps. The pumps tended to lose their prime, and as a result, lost pumping ability.
4. Improper contruction caused problems on certain well heads. Better oversight and installation could have prevented additional unneeded maintenance.
5. Sensaphone SCADA 3000 was used at this site. This was one of the first SCADA 3000 units used in the field, and caused problems due to being located too close to the electrical panel. Electromagnetic fields generated from motor starters caused electrical disturbance which deleted SCADA programming.
6. Sequestering agent pump was not tied into the SCADA shut-down sequence. As a result, sequestering agent continued to pump following shut-down and plugged the piping and tray stripper.
7. Dual phase extraction system was very successful in the area influenced by the extraction wells. Additional wells are needed to capture additional source area.
8.

Site Specific References

Not Provided

Contacts

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This profile last updated: March 25, 2003

Drycleaner Site Profiles

Roxy Cleaners, North Greenbush, NY

Site Description

The Roxy Cleaners inactive hazardous waste disposal site was an operating drycleaning facility from 1959 until about 1988. Roxy Cleaners continues to operate a distribution center on the site. Located in a mixed commercial/residential area, Roxy Cleaners is one of two business tenants occupying a 35,000 ft ^{2} lot on the Corner of Main Avenue and Orchard Terrace. The plant used perchloroethylene (PCE) as the drycleaning solvent throughout its operation. In 1984, an unreported spill of 55 gallons of PCE allegedly occurred outside, near the rear of the building. Other undocumented events and practices occurred during the period of operation which may have contributed to site contamination. In 1989, Roxy Cleaners reported PCE contamination in the private water supply well that they shared with adjacent commercial tenants. A survey of private wells in the area found that 16 private wells were contaminated with levels in excess of the drinking water standard. Carbon filters were immediately placed on all impacted drinking water wells. A soil gas survey was used to map groundwater contamination and adjacent buildings were screened for indoor air contamination. Unacceptable levels of PCE were found in the basement of one building and a venting system was installed.

Site Hydrogeology

Depth to ground water: not available

Lithology/subsurface geology: not available

Conductivity: not available

Gradient: not available

Groundwater Contamination

DNAPLs Present: No

Contaminants present: PCE, trichloroethylene (TCE), 1,2-dichloroethylene (1,2-DCE)

Highest contaminant concentrations: overburden –- 13,000 µg/L, PCE, 120 µg/L, TCE and 150 µg/L, 1,2-DCE; bedrock -- 2300 µg/L PCE, 33 µg/L TCE and 52 µg/L 1,2 DCE

Deepest significant ground-water contamination: no available

Plume size: About 900 ft. long and 300 ft. wide in overburden aquifer; about 900 ft. long and 400 ft. wide in bedrock aquifer

Soil Contamination

Contaminants present: PCE, TCE

Highest contaminant concentrations 2,920 mg/kg, PCEp; 105 µg/kg, TCE

Description of Remediation Scenario

Cleanup Goals: To reduce the mass and concentration of contaminants in groundwater; to control migration of the groundwater contamination; and to reduce the generation of contaminated soil gas vapors near the site.

Technologies Used:
Air Stripping
Pump and Treat
Removal
Soil Vapor Extraction (SVE)

Any other technologies used:

Why was technology or technologies selected:

Date Implemented:

Final remediation design: Soil vapor extraction (SVE) was installed to remediate the on-site source of contamination in the vadose zone as an Interim Remedial Measure during the remedial investigation (RI). The system was installed around the Roxy Cleaners building, removing 346 lbs of PCE in eight months and reducing PCE concentrations in soil to below 425 µg/kg. A venting system was installed in an adjacent building with soil gas levels concerns during the RI. This system was discontinued after the SVE was completed. Three groundwater extraction wells were installed. Two wells (one bedrock and one overburden) were installed on site in the source area to exert hydraulic control, and one will be installed off site in the overburden to reduce mass, reduce vaporization to soil gas, and control groundwater migration. A waterline extension was constructed to provide a source of uncontaminated drinking water to impacted and potentially impacted residents. Granular activated carbon (GAC) filters were maintained on the impacted wells until the waterline extension was completed.

Results

Results achieved to date::
Immediate - Construction of the basement venting system and installation of GAC filters on impacted wells removed unacceptable exposures until the final remedy could be implemented.

Soil - The SVE system reduced vadose zone contamination levels to acceptable levels. The soil cleanup objective for PCE was 1.4 µg/kg, and confirmatory sampling indicated residual levels were a maximum of 0.425 µg/kg.

Groundwater - Overall, the on-site and off-site groundwater extraction system has

reduced levels of contamination approximately 50% in the last three years; however, levels in one of the three extraction wells has actually increased. Levels are still two orders of magnitude above the groundwater standards.

Costs

Site assessment: $635,000
Interim Remedial Measure $ 233,000
Design and implementation:
$ 1,690,000

O&M: $ 177,000

Total costs (only completed sites):

Lessons Learned

1. A comprehensive approach is needed.
2. While drycleaner sites are similar, they are not the same.
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Site Specific References

1. Phase I and II Hydrogeologic Investigation, Roxy Cleaners, Spill No.89-01208, Empire Soils Investigation, Inc. July 1990
2. Remedial Investigation and Feasibility Study (3 volumes), Roxy Cleaners, Metcalf and Eddy, October 1991
3. Roxy Cleaners Vacuum Extraction Final Project Report, July 1993
4. Record of Decision - Roxy Cleaners Site 4-42-024 March 1994

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This profile last updated: March 10, 2003

Drycleaner Site Profiles

Sparta Laundry Basket, Sparta, MI

Site Description

This is an active drycleaning/laundromat facility that uses PCE. During monitor well sampling it was discovered that an underground storage tank containing PCE was leaking.

The facility is located in a mixed commercial/residential setting.

Site Hydrogeology

Depth to ground water: 16-18 ft.

Lithology/subsurface geology: surface-20 ft. bgs., fine to medium-grained sand; 20-25 ft. bgs., stiff clay; 25-33 ft. bgs., sand; 33 ft.bgs., clay

Conductivity: 1 - 20

Gradient:

Groundwater Contamination

DNAPLs Present: Unknown

Contaminants present: PCE, TCE, 1,1,1 TCA

Highest contaminant concentrations: PCE - 12,000 µg/l; TCE = 50 µg/l; TCA = 19 µg/l

Deepest significant ground-water contamination: 34 ft. bgs.

Plume size: 600 ft. x 700 ft.

DNAPLs present: Based on the high PCE concenrations in groundwater, DNAPL is presumed to be present.

Soil Contamination

Contaminants present: NA

Highest contaminant concentrations

Description of Remediation Scenario

Cleanup Goals: PCE = 5.0 µg/l, TCE = 5.0 µg/l, 111-TCA = 200 µg/l

Technologies Used:
Pump and Treat
Removal
Carbon Adsorption

Any other technologies used:

Why was technology or technologies selected: Pump-and-treat was selected to contain the groundwater contaminant plume. SVE is a proven technology for the removal of VOCs from permeable unsaturated sediments.

Date Implemented: The pump & treat system began operating in June of 1991. The UST was removed and some contaminated soil surrounding the tank were excavated in September 1990.

Final remediation design: Water from the pump-and-treat system was treated using granular activated carbon and then discharged to a nearby creek.

Results

The system was operated until December of 1995. Approximately 46.74 million gallons of water were recovered and treated. PCE concentrations in water samples collected from one monitor well dropped from 2,300 µg/l to 180 µg/l; TCE concentrations were reduced from 23 µg/l to 15 µg/l; and 111-TCA concentrations were reduced from 19 µg/l to non-detect.

Costs

Site assessment: No cost data are available.

Design and implementation:

O&M:

Total costs (only completed sites):

Lessons Learned

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Site Specific References

NA

Contacts

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This profile last updated: August 27, 2002

Drycleaner Site Profiles

Stanton Cleaners Area Groundwater Contamination Site, Great Neck, Nassau County, NY

Site Description

Stanton Dry Cleaners is an active facility that has existed since 1958. The site is approximately 1/4 of an acre in size. The site is located in a mixed commercial/residential area. Immediately adjacent properties include a tennis facility, a school facility, a synagogue, a condominium, and a service station. Three public drinking water supply wells are located approximately 1,000 ft from the Stanton Cleaners site.

Site Hydrogeology

Depth to ground water: about 70 ft bgs

Lithology/subsurface geology:

Long Island is situated on bedrock overlain by sediment. There are three major aquifers: the Upper Glacial, the Magothy and the Lloyd. The Upper Glacial consists of fine to coarse layers of sand and gravel, boulders and clay and ranges from approximately 95 ft thick to approximately 170 ft thick beneath the site. The Magothy is situated directly below the Upper Glacial and consists of layers of fine sands, clays, silts and some course beds of sands and gravel. It is the principal water supply aquifer in this area. The Lloyd is directly beneath the Magothy and consists of primarily of sand and rest directly on bedrock. The Lloyd is considered the backup water supply aquifer.

Conductivity: 1,234 ft/day (horizontal)

Gradient: 0.0112 ft/ft (average)

Groundwater Contamination

DNAPLs Present: No

Contaminants present: Perchloroethylene (PCE), trichloroethylene (TCE), dichloroethylene (DCE)

Highest contaminant concentrations:: Combined levels of PCE,TCE and DCE exceeded 40,000 µg/L.

Deepest significant ground-water contamination: About 100 ft

Plume size: *not available*

Soil Contamination

Contaminants present: PCE, TCE, DCE

Highest contaminant concentrations: 40,000 mg/kg (PCE)

Description of Remediation Scenario

Cleanup Goals: Reduce, control or eliminate contaminants in soil and groundwater to the maximum extent practicable; restore the aquifer to its best beneficial use; eliminate the potential for human exposure to contaminated site groundwater, soil, and indoor air.

Technologies Used:
Air Stripping
Pump and Treat
Soil Vapor Extraction (SVE)

Any other technologies used:

Why technology or technologies selected:

Date Implemented: 1998

Final remediation design:
NOTE: PCE levels in soil vapor that exceeded the New York State Dept. of Health guidance values for concern (100 $\mu g/m^3$) and immediate action (1,000 $\mu g/m^3$) were detected in the neighboring tennis facility and synagogue.

In 1989 a groundwater extraction and treatment system was installed to address groundwater contamination migrating from the site. In September 1998, migration controls (venting system) were installed to prevent PCE from migrating into the tennis structure and parking garage. In December 1998, a soil vapor extraction (SVE) system was installed to further mitigate indoor air impacts and for PCE source removal. In 1999, a Record of Decision was issued that required continued operation of the SVE system, upgrade of the groundwater extraction system to address groundwater contamination on the site, monitoring of indoor air, long term groundwater monitoring, and groundwater use restrictions. An additional study for other sources of groundwater contamination is planned.

Results

Results achieved to date::
Immediate - Implementation of the SVE and venting systems resulted in the reduction of PCE levels in the adjacent structures to acceptable levels. In 2002, EPA removal action performed for the removal of underground PCE storage tanks.

Soil - Continued operation of the SVE system for PCE source removal. Approximately 16,000 lbs of PCE removed to-date.

Groundwater - Interim groundwater P&T was operational using portable system and pumping IW-01 interceptor well. Approximately 750,000 gallons pumped @ 15 gpm.

Remedied groundwater extraction system on-line October 2001. Pumped approximately 7,000,000 gallons as of April 2002.

Costs

Site assessment: $302,000 (RI/FS)

Design and implementation:
Interim Remedial Measure - $1,300,000 (implementation and operation of Soil-Vapor Extraction System)
Design and Implementation - $ 1,000,000 (includes Operable Unit 2)

O&M: $ 450K for two years, then $ 225K for the next 18 years

Total costs (only completed sites):

Lessons Learned

1. Implementation of SVE system immediately reduced indoor levels from surrounding structures to acceptable levels.
2. High source removal (approximately 16,000 lbs of PCE) is suggested to have reduced the proposed groundwater extraction system operation time. PCE pumping concentrations in groundwater have steadily been reduced within a short pumping period.
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Site Specific References

1. Site Investigation and Remedial Option Evaluation, Stanton Cleaners, Sept 1886

2. Remedial Investigation/ Feasibility Study Workplan, Stanton Cleaners, April 1997

3. Remedial Investigation/Feasibility Study Workplan, Stanton Cleaners, May 1998

4. Remedial Investigation/Feasibility Study Report, Stanton Cleaners, January 1999

5. Proposed Remedial Action Plan, Stanton Cleaners, February 1999

6. Record of Decision, Stanton Cleaners, March 1999

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This profile last updated: March 10, 2003

Drycleaner Site Profiles

Varsity Cleaners, Temple Terrace, FL

Site Description

Drycleaning using PCE, was conducted in a stand-alone building at this site from the mid-1960s until 1998. The building housing the drycleaning operation was previously occupied by an auto service center. In 1998, Varsity Cleaners moved to a new building located on an adjacent property.

The site is located in a mixed commercial/residential setting. A service station with associated petroleum contamination was formerly located on an adjacent property. The nearest water supply well is located one-half mile northeast of the site.

The contaminant source areas identified at the facility were the soils beneath the building floor slab near the drycleaning machine, the area near the service door, and a concrete vault located beneath the facility floor slab that received wastewater.

Site Hydrogeology

Depth to ground water: 20 ft bgs

Lithology/subsurface geology: fine-grained sand, surface - 22 ft bgs;
clay, 22 - 28 ft bgs;
sandy clay, clay and weathered limestone 28 - 50 ft bgs.

Conductivity: 2.9 ft/day

Gradient: 0.008 ft/ft

Groundwater Contamination

DNAPLs Present: Yes

Contaminants present: PCE, TCE, cis 1,2-DCE, n-butylbenzene, sec-butylbenzene, tert butylbenzene, p-isorpropyltoluene, naphthalene, n-propylbenzene, toluene, ethylbenzene, xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene.

Highest contaminant concentrations: 4,940 µg/L PCE

Deepest significant ground-water contamination: 45 ft bgs

Plume size: 420 ft x 300 ft

Soil Contamination

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

Highest contaminant concentrations 2,260 µg/L PCE

Description of Remediation Scenario

Cleanup Goals: Groundwater - PCE = 3.0 µg/L; TCE = 3.0 µg/L; cis 1,2-DCE = 70 µg/L.

Soil - leachability standard - PCE = 30 µg/kg, TCE = 30 µg/kg, cis 1,2-DCE = 40 µg/kg

Technologies Used:
Pump and Treat
Removal
Soil Vapor Extraction (SVE)

Any other technologies used:

Why was technology or technologies selected: Removal and onsite treatment of soils (using SVE) was selected because the building that housed the drycleaning operations had been razed.

Date Implemented: Excavation began 9/14/98. Onsite soil treatment 9/30/98 to 11/5/98. Pump & treat began 11/29/99.

Final remediation design: Sheet piling was driven to from 26 to 34 feet bgs on the northern property boundary to stabilize the excavation near the newly constructed drycleaning facility. A total of 3,250 cubic yards of soils was excavated (30 x 30 ft. area to 20 ft. bgs with a 2:2 slope - total excavated area of 70 x 110 ft). Soil grab samples were analyzed onsite with a portable gas chromatograph. Soils with detectable levels of PCE were stockpiled in a bermed area with a leachate collection system. Parallel 4-inch screened PVC pipes were installed horizontally, 1 foot from the bottom of the treatment pile with valves installed on both ends of the piping to allow vacuum or a passive vent to the atmosphere to be applied to the soil pile. SVE pipes were then alternated between passive air, air recovery, and air injection points. Two 4-inch diameter pipes were installed along the length of the pile 5 feet from the bottom of the pile.

The treatment pile contained approximately 1,750 cubic yards of soil - 108 x 40 x 8 ft. The pile was covered with visqueen to prevent short circuiting from the atmosphere. Longitudinal piping was used for air input and the transverse pipes were used for air recovery. During treatment, air input and recovery pipes were alternated. Recovered leachate was treated using air strippers and then discharged to an exfiltration gallery.

For the groundwater recovery system, a trench box (6 x 20 x 14 ft) was installed at the base of the excavation - to a total depth of 34 ft bgs - into the top of the weathered limestone. Three sets of 20 foot horizontal, 6-inch diameter, perforated PVC pipes were installed in the trench box, at depth of 34, 24 and 18 ft bgs. Both ends of the pipes were fitted with 6-inch risers and backfilled. The trench box was then lined with geotextile

fabric and backfilled with 57 stone. The excavation was then backfilled with the treated soil.

The pump & treat system consists of a Grunfos 5E5 submersible pump with a design flow rate of 4-5 gpm. The system is operated only during the wet season. Extracted water is treated with two 200 lb. GAC filters.

Results

Operating flow rate for the pump & treat system is approximately 1.5 gpm. The system is operated only during the wet season. Initial influent concentrations for the pump & treat system were as high as 660 µg/L PCE. During the latest operation period, influent concentrations were as high as 440 µg/L PCE. Through December 2, 2001, a total of 392,381 gallons of water had been treated by the system.

Costs

Site assessment: $ 148,300

soil excavation & treatment: $ 387,300

remedial system design & construction: $ 111,400

operation & maintenance: $ 43,600 excavation

Total costs (only completed sites):

Lessons Learned

1. If an excavation had not been conducted, the underground vault would not have been discovered and would have been an ongoing contaminant source. The vault received laundry wastewater and contact water from the drycleaning operation.

2. The clay and weathered limestone at the site contain residual sorbed contaminants that are being addressed by the pump & treat system, but the removal of contaminated soils at the site has resulted in a significant decrease in contaminant concentrations in groundwater.

3. Since very little groundwater can be recovered from the pump & treat during the dry season, the system is being operated only during the wet season.

Site Specific References

Contantamination Assessment Report - June, 1998

Subsurface Exploration & Geotechnical Engineering Evaluation - July, 1998

Performance Reports

Contacts

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