General Information

Site Name and Location:	Daisy Fresh Dry Cleaners College Park, Georgia, United States
Description: Historical activity that resulted in contamination.	The Daisy Fresh Dry Cleaners is located in the Old National Shopping Center (HSI Site #10594). Drycleaning has been done at this location since 1978. The current drycleaner serves only as a transfer station for laundry to be drycleaned off site. The existing areas of soil contamination appear to be near a former headwall associated with an old culvert and beneath the drycleaner, where the drycleaning machines were located. A drycleaner in the adjacent strip shopping center is downgradient of the site. Although this downgradient drycleaner has a known release of chlorinated solvents to groundwater, the plume originating from the Daisy Fresh Dry Cleaners does not appear to be comingled with the plume from the other drycleaner. Most of the site is paved and contains commercial businesses. Cleanup is being performed by Lakeshore Village Partnership, owner of the shopping center where the dry cleaner is located.

Contaminants:

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).	**Contaminant**	**Conc in GW**	**Conc. in Soil m**
	1,1-Dichloroethene		11 : g/kg
	1,2-Dichloroethene		47 : g/kg
	Benzene		8 : g/kg
	chloroform	33 : g/l	44 : g/kg
	cis-1,2-Dichloroethene	1,600 : g/l	12,600 : g/kg
	naphthalene		16 : g/kg
	Tetrachloroethene (PCE)	20,000 : g/l	219,000 : g/kg
	Trichloroethene (TCE)	2,300 : g/l	560,000 : g/kg
	Vinyl Chloride	18 : g/l	600 : g/kg
	xylenes	16 : g/l	87 : g/kg
Other Contaminants Present: Indicates what other contaminants were found on-site	None		

Deepest Significant Groundwater Contamination:	80 ft
Plume Size:	200 ft in width X 500 ft in length
Site Hydrology:	
Depth to Groundwater:	10 to 15 ft bgs
Lithology and Subsurface Geology:	Sandy silts and silty sand material, 0-57 ft; Below the saprolite is a granite gneiss. The bedrock is highly fractured at a depth of 63 ft. Below this is a zone of moderate fractures including some high-angle fracturing at a depth of 70 ft. Competent bedrock with limited high-angle fractures is encountered from 70-83 ft bgs
Conductivity:	approximately 275 ft/yr
Gradient:	Horizontal, 0.00624 ft/ft; Vert ical, 0.00276 ft/ft
Media:	
Media:	Groundwater Soil
Remediation Scenario:	
Cleanup Goals:	PCE and TCE in soil - 0.5 mg/kg VC in soil - 0.044 mg/kg Cis-1,2-DCE in soil - 78.2 mg/kg PCE and TCE in groundwater- 5 : g/l VC in groundwater - 2 : g/l Cis-1,2 DCE in groundwater - 156 : g/l
Technologies:	
Technologies Used:	In Situ: Chemical Oxidation Monitored Natural Attenuation
Other technologies used:	Enhanced Fluid Recovery (EFR). This is a remediation technology similar to SVE.

Why the technology was selected: Extraction of groundwater and vapors using EFR was selected to reduce the concentrations in soil and groundwater. The idea behind the use of EFR is to remove as much contamination in the shortest time possible to reduce the amount of chemicals added for in-situ chemical oxidation (ISCO). ISCO has been demonstrated at other sites to be an effective technology for the remediation of VOCs. The sandy soils at the site make ISCO particularly appropriate for this site. MNA will be utilized to further remediate contamination in groundwater following active remediation by ISCO and EFR.

Date implemented: September 11, 2002.

Final remediation design: EFR is accomplished by applying high levels of vacuum pressure to either monitoring wells or extraction wells through a drop tube applied near the static groundwater table in the well. Each EFR event was about 24 hours long. The EFR events use truck-mounted vacuum equipment and a tank capable of extracting 3,000 gallons. The combined air and liquids are transferred to a treatment system where the liquids are separated with a liquid scrubber/knockout system and discharged to a storage tank. Halogenated vapors are incinerated in a forced air Thermal Oxidation Unit. The extracted water is disposed offsite. ISOTEC's chemical oxidation process was used at the site. It is based on modified Fenton's chemistry using a proprietary catalyst/oxidizer mix (reagent) to produce free radical oxidants and reductants that attack chemical bonds. Injections were performed using both temporary direct push (DP) injection points as well as permanent monitoring wells. Based on the chemistry of the ISOTEC process, it is not necessary to add acids or pH modifiers. The initial Phase 1 pilot study (April 8, 2003 and April 22, 2003)concentrated on remediation of soil and groundwater within an approximate 50-ft elliptical radius centered on the former headwall location where most of the soil and groundwater contamination is concentrated. The target vertical treatment zone included unsaturated soils at the interval of 2-18 ft bgs, saturated soils between 18 and 50 ft bgs, and deeper fractured rock (up to 80 ft bgs). A total of 46 DP points with multiple injection intervals and 12 injection wells were used for the ISCO. Exact spacing is detemined by the concentrations of VOCs in soil and groundwater. Generally, the ISCO reagents were applied at 4-ft intervals in the unsaturated zone and 9-ft intervals in the saturated zone. The injection activity typically occurs under a low pressure condition between 15 and 40 psi, with a few locations noted to be as high as 60-100 psi due to localized tight geology. During the two phase ISCO pilot study (August 25, 2003 and September 25, 2003), 54,190 gallons of ISOTEC reagents were injected to further reduce contaminant concentrations where the Phase 1 pilot was done, and to treat selected hot spots downgradient of the drycleaner and deeper zones of groundwater contamination.

Results and Next Steps:

Results to date: According to reports prepared by EFR contractor Fruits and Associates, Inc., approximately 190 gallons of solvents have been removed.

A limited number of soil samples were taken following the Phase 1 ISCO pilot. No soil samples were taken following Phase 2. VOCs in two soil samples were reduced from 105 : g/kg and 87 : g/kg to non-detect in both soil samples. At least 30 days were allowed after the completion of each phase of the chemical injection prior to obtaining soil or groundwater samples. Following the Phase 1 pilot study, average VOCs in groundwater generally decreased by 83 percent based on groundwater samples from 9 monitoring wells compared to baseline concentrations taken April 2003 prior to the Phase 1 pilot study.

Following the Phase 2 pilot study, average VOCs generally decreased by 89 percent based on the differences between baseline conditions measured in April 2003 and the post-Phase 2 groundwater samples from 6 wells. Results from well MW-29 are not included because VOCs increased from a baseline of 427 : g/l to 3,166 : g/l following the Phase 2 injection event. In well 5A, even though PCE concentrations dropped from a baseline of 5,500 : g/l to 100 : g/l following the Phase 1 pilot study, it was noted that the PCE concentration in this well had increased to 860 : g/l following the Phase 2 pilot study. Compared to baseline conditons, this still represents an 84 percent reduction in PCE following Phase 2 compared to baseline concentrations prior to any ISCO.

The increases noted in wells MW-5A and MW-29 are attributed to desorption of solvents from soil. According to research utilizing Fenton's reagents, Fenton's reactions produce both oxidizing and reducing species. Reductive species are involved in desorbing contamination from VOCs sorbed on soil particles into a dissolved phase in the groundwater. Once the VOC contamination that was associated with the soil has been transferred to a dissolved phase, further ISCO treatments should be more effective in permanently reducing VOC concentrations in groundwater.

To estimate the radial effects of influence from chemical injection, water bubbling and rising were observed in nearby monitoring wells. Based on the monitoring wells relative to the injection points, a conservative radial extent of treatment ranging between 5 and 10 ft was observed as reasonable for the site. This means that in areas with highest VOC concentrations, a tighter injection grid of 10 ft would be necessary between injection points while in other less contaminated areas, a 20-ft spacing between injection points would be satisfactory.

Next Steps: For soils near the former headwall, EFR is being proposed for further treatment. This is the general area where both phases of the pilot study incorporating ISCO were done. The idea here is that ISCO has desorbed VOCs from soil in this area and the EFR should now be more effective in this area. EFR is also proposed for the soil underlying the area where the former drycleaning machines were located. ISCO was never performed under the building where PCE is greater than its cleanup standard of 0.5 mg/kg because of concern that fumes may be released in the building. Further full-scale ISCO is proposed for both the shallow and deeper groundwater aquifers. For the deeper aquifer, it will be necessary to use wells to inject the reagents because of limitations of the geoprobe equipment. For the shallower aquifer, injection points should be adequate in addition to wells. MNA will continue to be evaluated as a remediation technology following the application of the full scale ISCO.

Costs:

Cost for Assessment: Unknown

Cost to Design and Implement: Costs are currently being developed

Cost for Operation and Maintenance: Costs are currently being developed

Total Costs for Cleanup:

Lessons Learned:

Lessons Learned: . The MNA fesbility study that was performed prior to the ISCO pilot study indicated that a reductive environment existed in at least part of the plume. Groundwater samples collected 12 weeks following ISCO injections indicate that the oxidative environment produced during the chemical ISCO application was still present. According to the ISCO contractor, it is common to see an oxidative environment persist at least temporarily resulting from the hydrogen peroxide injection until all oxygen is consumed.

Contacts:

Principal Point of Contact:

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Consulting Engineer for Lakeshore Village Partnership:
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1675 Spectrum Drive
Lawrenceville, Georgia 30043
Phone: (770)962-5922

Site Specific References:

Site Specific References:

1) Sailors Engineering Associates "Corrective Action Plan, Old National Shopping Center, 2555 Flat Shoals Road, College Park, Georgia" dated December 24, 2003, prepared for Lakeshore Village Partnership
2) Sailors Engineering Associates "Compliance Status Report, Old National Shopping Center, 2555 Flat Shoals Road, College Park, Georgia" dated June 2003, prepared for Lakeshore Village Partnership

Images:

Images of Site:

Profile last updated on May 17, 2004

General Information

Site Name and Location:	Former Alpine Cleaners Friendswood, Texas, United States
Description: Historical activity that resulted in contamination. Contaminants:	Alpine Cleaners operated as a PCE drycleaner from 1989 to 1998. A sewer line break was reportedly one of the pathways for contaminant migration into the subsurface. Spills at the facility and discharges to a storm sewer were also identified as possible source areas.

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).	**Contaminant**	**Conc in GW**	**Conc. in Soil**
	1,1-Dichloroethene	5.9 : g/l	
	cis-1,2-Dichloroethene	3,100 : g/l	
	Tetrachloroethene (PCE)	2,940 : g/l	
	Trichloroethene (TCE)	1,400 : g/l	
	Vinyl Chloride	300 : g/l	

Other Contaminants Present: Indicates what other contaminants were found on-site	Contaminant concentrations in soil were below cleanup standards
Deepest Significant Groundwater Contamination:	16 ft. bgs
Plume Size:	50 ft long

Site Hydrology:

Depth to Groundwater: 10 ft. bgs

Lithology and Subsurface Geology: Silty, fine-grained sand, surface-16 ft bgs

Conductivity: 0.283 ft/day

Gradient: 0.003 - 0.008 ft./ft

Media:

Media: Groundwater

Remediation Scenario:

Cleanup Goals: PCE = 5 : g/l; TCE = 5 : g/l; cis 1,2-DCE = 70 : g/l; vinyl chloride = 2 : g/l

Technologies:

Technologies Used: In Situ:
Chemical Oxidation

Other technologies used:

Why the technology was selected: Based on bench scale testing, in-situ chemical oxidation was selected

Date implemented: 1999

Final remediation design: In 1999, there were two five-day injection events utilizing hydrogen peroxide, in three injection wells. The volume of treated groundwater was estimated to be approximately 17,000 gallons. Initially, an aqueous solution of ferrous sulfate and hydrochloric acid was injected. This was followed by hydrochloric acid and finally by a 35% solution of hydrogen peroxide (495 gallons in the first event and 605 gallons in the second injection event). In August and September of 2001, a total of 135 gallons of a 5.5% solution of potassium permanganate was injected at the site.

Results and Next Steps:

Results to date: Groundwater monitoring conducted two weeks after treatment indicated a 33% reduction in contaminant concentrations. The estimated aerial extent of treatment was estimated to be a 10-ft radius around each injection well.

Although concentrations of PCE degradation products in groundwater have increased, PCE and TCE concentrations decreased by an order of magnitude between July 1998 and September 2002. Natural attenuation of contaminants appears to be occuring at a rate sufficient to reduce contaminant concentrations and limit the potential for downgradient migration.

Next Steps: Continued monitoring of natural attenuation at the site.

Costs:

Cost for Assessment: No costs were available

Cost to Design and Implement:

Cost for Operation and Maintenance:

Total Costs for Cleanup:

Lessons Learned:

Lessons Learned:

Contacts:

Principal Point of Contact: Richard Scharlach
Texas Commission on Environmental Quality (TCEQ)
Voluntary Clean-up Program
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Austin, Texas 78753

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Site Specific References:

Site Specific References:

Images:

Images of Site:

Profile last updated on May 24, 2004

General Information

Site Name and Location:	Park Avenue Cleaners Richardson, Texas, United States
Description: Historical activity that resulted in contamination.	Park Avenue Cleaners is an active PCE drycleaning facility that has been in operation since 1975. The facility is located in a shopping center in a commercial retail setting. PCE and TCE were identified in soil and groundwater during investigations conducted in 1998. The contaminant source areas are the soils beneath the facility floor slab and a utility trench.

Contaminants:

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).	**Contaminant**	**Conc in GW**	**Conc. in Soil**
	cis-1,2-Dichloroethene	56 : g/l	56 : g/kg
	Tetrachloroethene (PCE)	470 : g/l	44,590 : g/kg
	trans-1,2-Dichloroethene	4 : g/l	
	Trichloroethene (TCE)	150 : g/l	940 : g/kg
	xylenes	1 ug/l	

Other Contaminants Present: Indicates what other contaminants were found on-site	soil - chlorobenzene - 19 : g/kg
Deepest Significant Groundwater Contamination:	12 ft bgs
Plume Size:	0.4 acres

Site Hydrology:

Depth to Groundwater: 7.5 - 10.5 ft bgs (perched aquifer)

Lithology and Subsurface Geology: Clay, surface-8 ft bgs; Weathered limestone, 8-12 ft bgs

Conductivity: 0.0349 - 0.154 ft./day

Gradient: 0.08 ft./ft.

Media:

Media: Groundwater
Soil

Remediation Scenario:

Cleanup Goals: Soil: PCE = 5,000 : g/kg; TCE = 5,000 : g/kg Groundwater: PCE = 500 : g/l; TCE = 500 : g/l

Technologies:

Technologies Used: In Situ:
Chemical Oxidation

Other technologies used:

Why the technology was selected: Based on a four-month bench scale test, in-situ chemical oxidation using Fenton's reaction was chosen as the remedy for the site.

Date implemented: September 2000

Final remediation design: Three injection points were installed 60-80 ft apart to depths of 7-10 ft bgs. Prior to injection, hydraulic fracturing was used to propogate fractures in the clay and weathered limestone. Coarse sand was used as a proppant. Calculations showed that induced fractures had a radial extent of approximately 60 ft. A total of six injection events were conducted: four in September, one in October, and one in November of 2000. A total of 550 gallons of a biodegradeable surfactant was injected at each injection point to desorb the contaminants from the soil. Next, a total of 310 gallons of a proprietary catalyst solution was injected at each point. Finally, a mixture of a proprietary acid (total of 270 gallons) and a hydrogen peroxide solution (total of 640 gallons) was injected. The maximum injection rate was 1.0 gpm.

Results and Next Steps:

Results to date: Post-remediation soil sampling was conducted in March 2001 and post-remediation groundwater sampling was conducted during the first half of 2001. Soil contaminant concentrations were reduced by 99% and contaminant concentrations in groundwater were reduced by 95-100%. The total area of groundwater treatment was approximately 0.4 acre.

Next Steps: A Certificate of Completion was issued on October 16, 2002.

Costs:

Cost for Assessment: No cost data was available.

Cost to Design and Implement:

Cost for Operation and Maintenance:

Total Costs for Cleanup:

Lessons Learned:

Lessons Learned:

Contacts:

Principal Point of Contact:

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Texas Commission on Environmental Quality (TCEQ)
Voluntary Cleanup Program
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David Lent
IVI Environmental, Inc.
105 Corporate Park Drive
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Phone: 914-694-9600

Site Specific References:

Site Specific References:

Images:

Images of Site:

Profile last updated on May 19, 2004

General Information

Site Name and Location:	Spin City Dry Cleaners Plano, Texas, United States
Description: Historical activity that resulted in contamination.	Spin City Dry Cleaners (Dry Clean City - $1.25) was a PCE drycleaning facility that operated in the Parkwood Square Shopping Center from 1984 - 2000. In 1997, an investigation found contaminated soil and groundwater at the site. The contaminant source area is the soil beneath the facility floor slab.

Contaminants:

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).	**Contaminant**	**Conc in GW**	**Conc. in Soil**
	cis-1,2-Dichloroethene	900 : g/l	130 : g/kg
	Tetrachloroethene (PCE)	2,900 : g/l	47,350 : g/kg
	trans-1,2-Dichloroethene	140 : g/kg	
	Trichloroethene (TCE)	320 : g/l	1,500 : g/kg

Other Contaminants Present: Indicates what other contaminants were found on-site	
Deepest Significant Groundwater Contamination:	18 ft bgs
Plume Size:	0.74 acre

Site Hydrology:

Depth to Groundwater: 3 - 12 ft bgs

Lithology and Subsurface Geology: Clay with gravel and minor sand, surface-16 ft bgs; Weathered limestone, 16-18 ft bgs

Conductivity: 0.181 - 0.237 ft./day

Gradient: 0.01 ft./ft

Media:

Media: Groundwater
Soil

Remediation Scenario:

Cleanup Goals: Groundwater: PCE = 500 : g/l Soil: PCE - 500 : g/kg; TCE = 500 : g/kg

Technologies:

Technologies Used: In Situ:
Chemical Oxidation

Other technologies used:

Why the technology was selected: In-situ chemical oxidation using Fenton's reaction was selected after a four-month bench test using soil samples collected from the site.

Date implemented: September 2000

Final remediation design: Four injection points were installed to depths of 16 to 18 ft BGS using a pneumatic hammer. Three injection points were screened for horizontal distribution of injectants and one point was screened vertically to facilitate vertical distribution of injectants over the contaminated soil. Hydraulic fracturing was utilized to introduce course sand to propogate fractures in the aquifer. Calculations indicate that the radial extent of the induced fractures was 60 ft. Water was injected into the the vertically screened injection point to saturate the vadose zone soils. Six injection events were conducted: 4 in September, one in October and one in November of 2000. A biodegradeable surfactant (550 gallons) was injected at each injection point to desorb contaminants from the soil/aquifer. This was followed by a solution of proprietary catalyst (116 gallons). Finally, a mixture of a proprietary acid (295 gallons) and hydrogen peroxide (515 gallons, concentration not given) was injected at each injection point. The maximum injection rate was 2.0 for the the horizontal points and 0.7 gallons for the vertical point. The volume of treated soil was approximatley 172 cubic yards. The groundwater treatment area was approximately 0.74 acres.

Results and Next Steps:

Results to date: Post-remediation soil sampling was conducted in March 2001, and post-remediation groundwater sampling was conducted in January 2001. Contaminant concentrations were reduced 56 to 99.9% in soils and groundwater contaminant concentrations showed reductions of 83 to 100%.

Next Steps: A Certificate of Completion was issued for the site on November 12, 2002.

Costs:

Cost for Assessment: No cost data was available

Cost to Design and Implement:

Cost for Operation and Maintenance:

Total Costs for Cleanup:

Lessons Learned:

Lessons Learned:

Contacts:

Principal Point of Contact:

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Site Specific References:

Site Specific References:

Images:

Images of Site:

Profile last updated on Oct 21, 2004