

**General Information**

**Site Name and Location:**

ABC One-Hour Cleaners  
 Jacksonville, North Carolina, United States

**Description: Historical activity that resulted in contamination.**

The ABC facility is located at 2127 Lejune Boulevard in Jacksonville, North Carolina. The facility encompasses an area of approximately one acre. The dry cleaning establishment, consisting of three buildings joined to form one complex, is located on the southern portion of the property. Two source areas were identified. The primary source area was the former septic tank system. A secondary source consisted of still bottoms which were placed in the dirt driveway west of the building as a "pothole" fill. It is estimated that approximately one ton of still bottoms were placed on the driveway over a 30-year period.

**Contaminants:**

**Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).**

| <b>Contaminant</b>      | <b>Conc in GW</b> | <b>Conc. in Soil</b> |
|-------------------------|-------------------|----------------------|
| 1,2-Dichloroethene      | 1,200 : g/L       | < 31,000 : g/kg      |
| Tetrachloroethene (PCE) | 5,400 : g/L       | 2,100,000 : g/kg     |
| Trichloroethene (TCE)   | 640 : g/L         | 33,000 : g/kg        |
| Vinyl Chloride          | 110 : g/L         | < 31,000 : g/kg      |

**Other Contaminants Present: Indicates what other contaminants were found on-site**

**Deepest Significant Groundwater Contamination:**

90 feet bgs

**Plume Size:** 1500 feet x 400 feet x 90 feet

**Site Hydrology:**

**Depth to Groundwater:** Approximately 15 feet bgs

**Lithology and Subsurface Geology:**

The site is underlain by approximately 25 feet of interbedded sands, silts, and clay. The lower portion of this interbedded zone is saturated and may be partially confining. Saturated quartz sand extends from 25 feet bgs to a depth of approximately 70 feet bgs across most of the site. The Castle Hayne aquifer underlies the surficial sand aquifer. The Castle Hayne aquifer is comprised primarily of saturated fossiliferous sands and gravels with variable silt content. No confining layer separates the surficial aquifer from the Castle Hayne Aquifer in the vicinity of the site. Both the surficial and the Castle Hayne Aquifers have been impacted by releases from the site.

**Conductivity:** 10.3

**Gradient:** 0.007

**Media:**

**Media:** Groundwater  
Soil

**Remediation Scenario:**

**Cleanup Goals:** Contaminated soils are being addressed using a SVE system. Groundwater is treated using an extraction system (pumping well). The extracted groundwater is treated by air stripping. Periodic groundwater monitoring is conducted to estimate treatment efficiency. Institutional controls have been implemented on well construction and water use in the the general area of the site.

**Technologies:**

**Technologies Used:** In Situ:  
Soil Vapor Extraction  
Ex Situ:  
Air Stripping  
Pump and Treat

**Other technologies used:**

*State Coalition for Remediation of Drycleaners*

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**Why the technology was selected:** The above technologies were selected based on evaluation criteria set forth in the NCP, including protection of human health and the environment, statutory requirements, long-term effectiveness and permanence, reduction of contamination through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance.

**Date implemented:** Soil: April 2000 Groundwater: January 1999

**Final remediation design:** Soil: remediation goals based on soil to groundwater leachability. Six extraction wells initially installed. One year estimated to reach cleanup goals. In July 2002, two additional wells installed and three others shut down. Groundwater: North Carolina Groundwater standards are remedial goals. Five extraction wells installed, four in the surficial aquifer and one in the Castle Hayne Aquifer.

**Results and Next Steps:**

**Results to date:** Soil: Concentrations have decreased, but the remedial objectives have not been met. Groundwater: Concentrations have decreased, but the remedial goals have not been met in the surficial aquifer. Contamination in the Castle Hayne Aquifer has migrated beyond the zone of extraction well influence.

**Next Steps:** Soil: Exand SVE system with two to three more wells.  
Groundwater: Install additional monitoring wells and investigate if monitored natural attenuation is a viable option.

**Costs:**

**Cost for Assessment:**

**Cost to Design and Implement:** Soil: 521,463  
Groundwater: 2,262,900

**Cost for Operation and Maintenance:**

**Total Costs for Cleanup:**

**Lessons Learned:**

**Lessons  
Learned:**

1. After more than a decade of soil and groundwater remediation, neither the soil nor the groundwater remediation goals have been attained. Soil excavation may have been a more expensive alternative than SVE; however, source removal would have been accomplished. The removal of the dominant source may have allowed the pump and treat system a better chance at remediation.

**Contacts:**

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**Site Specific References:**

**Site Specific  
References:**

**Images:**

**Images of  
Site:**

Profile last updated on Mar 28, 2005

**General Information**

**Site Name and Location:** Parisian Cleaners  
Orlando, Florida, United States

**Description:** Active drycleaning facility since 1954. Commercial property. Used petroleum-operated drycleaning machine. No information regarding historic waste generation, management practices, or haulers before 1994.

**Historical activity that resulted in contamination.**

**Contaminants:**

| <b>Contaminants:</b>   | <b>Contaminant</b>      | <b>Conc in GW</b> | <b>Conc. in Soil</b> |
|--|-------------------------|-------------------|----------------------|
| <b>Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).</b> | 1,2,4-trimethylbenzene  | 365 : g/L         | 410 : g/kg           |
|  | 1,3,5-trimethylbenzene  | 120 : g/L         |                      |
|  | naphthalene             |                   | 570 : g/kg           |
|  | Tetrachloroethene (PCE) | 320 : g/L         | 130 : g/kg           |
|  | Trichloroethene (TCE)   | 4.4 : g/L         |                      |
|  | xylenes                 |                   | 188 : g/kg           |

**Other Contaminants Present:** Indicates what other contaminants were found on-site

The concentrations shown for groundwater contaminants represent direct push data.

**Deepest Significant Groundwater Contamination:** 5.2 PCE @ 68 ft

**Plume Size:** <0.3 acre

**Site Hydrology:**

**Depth to  
Groundwater:** 12.5 ft bgs

**Lithology and**

**Subsurface  
Geology:** Tan to white, very fine-grained sands to 34 ft; Inter-bedded layers of gray to dark gray silts and clays, 34-62 ft

**Conductivity:**

**Gradient:** .003 ft/ft to .004 ft/ft.

**Media:**

**Media:** Groundwater  
Soil

**Remediation Scenario:**

**Cleanup Goals:** PCE--GW = 3 : g/L; Soil = .03 mg/kg(leachability); TCE-- GW = 3 : g/L; Soil = .03 mg/kg(leachability); Napthalene-- GW = 20 : g/L; Soil = 1.7mg/kg (leachability); 1,2,4 TMB-- GW = 10 : g/L; Soil = .3mg/kg (leachability); 1,3,5 TMB-- GW = 10 : g/L; Soil = .3mg/kg (leachability)

**Technologies:**

**Technologies  
Used:** In Situ:  
Soil Vapor Extraction

**Other  
technologies  
used:**

**Why the  
technology  
was selected:** Significant PCE soil contamination amendable to SVE technology

**Date  
implemented:** Start-up began-July 9, 2002 Construction began in February 2002

**Final remediation design:** Two vertical SVE wells. One was placed inside building; the other well placed next to building.

**Results and Next Steps:**

**Results to date:** No Further Action (NFA) for both soils and groundwater. Site Rehabilitation Completion Order(SRSCO)issued on 4/27/04.

**Next Steps:**

**Costs:**

**Cost for Assessment:** \$92,120.30

**Cost to Design and Implement:** \$72,458

**Cost for Operation and Maintenance:** \$29,264 = O&M \$8,689 = Monitoring

**Total Costs for Cleanup:** \$202,531

**Lessons Learned:**

**Lessons**

**Learned:** 1. Good soil sampling under the building providing good design of SVE system

**Contacts:**

**Principal Point of Contact:** Judie A. Kean, Project Manager  
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**Site Specific References:**

**Site Specific References:**

**Images:**

**Images of  
Site:**

Profile last updated on Apr 28, 2004

**General Information**

**Site Name and Location:**

Randolf's Cleaners & Alterations, Tallahassee, Florida, United States

**Description:  
Historical activity that resulted in contamination.**

Drycleaning Operations began at this facility in 1973. Petroleum solvent was utilized during the first twenty years of operations. In 1993, the facility switched to PCE. The drycleaning machine, service door, solvent storage and waste storage areas were identified as contaminant source areas. The facility is located in a mixed retail commercial/residential setting. A municipal water supply well is located approximately 160 feet northeast of the facility. This well is completed in the Floridan aquifer at from 170 to 364 feet BGS. The well has been impacted by PCE.

**Contaminants:**

| <b>Contaminants:<br/>Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).</b> | <b>Contaminant</b>       | <b>Conc in GW</b> | <b>Conc. in Soil</b> |
|--|--------------------------|-------------------|----------------------|
|  | cis-1,2-Dichloroethene   | 840 : g/l         |                      |
|  | Tetrachloroethene (PCE)  | 47,760 : g/L      | 18,000 : g/kg        |
|  | trans-1,2-Dichloroethene | 7 g/L             |                      |
|  | Trichloroethene (TCE)    | 275 : g/L         | 54 : g/Kg            |
|  | Vinyl Chloride           | 27 g/             |                      |

**Other Contaminants Present:  
Indicates what other contaminants were found on-site**

199 : g/Kg toluene 12,000 : g/kg TPH

**Deepest Significant Groundwater Contamination:**

> 156 ft BGS

**Plume Size:** 350 ft x 230 ft

**Site Hydrology:**

**Depth to Groundwater:** 45 - 55 ft BGS

**Lithology and Subsurface Geology:** Surface-20 ft BGS: silty to sandy clay interbedded with silt; 20-37 ft BGS: silty clay to clay; 37-53 ft BGS: silt, fine-grained sand with some clay; 53-80 ft BGS: silty clay interbedded with silt; 80-156 ft BGS: weathered limestone interbedded with sandy to plastic clay.

**Conductivity:** 3 ft/day

**Gradient:** 0.024 ft/ft

**Media:**

**Media:** DNAPL  
Groundwater  
Soil

**Remediation Scenario:**

**Cleanup Goals:** Groundwater: PCE = 3.0 : g/L; TCE = 3.0 : g/L; cis 1,2-DCE = 70 : g/L; vinyl chloride = 1.0 : g/L Soil: PCE = 30 : g/Kg; TCE = 30 : g/Kg; TPH = 340,000 ug/Kg;

**Technologies:**

**Technologies Used:** In Situ:  
Multi Phase Extraction  
Soil Vapor Extraction  
Ex Situ:  
Air Stripping  
Carbon Adsorption  
Pump and Treat

**Other technologies used:**

**Why the technology was selected:** Multi-phase extraction was chosen to recover contaminants through the drawdown of the water table in the relatively low-permeability sediments allowing for capture of VOCs by the SVE system. Hydraulic capture was augmented with two groundwater recovery wells. This is important given the proximity of the municipal supply well.

**Date implemented:** August 21, 2003

**Final remediation design:** MPE: Six, 5-inch diameter schedule 40 PVC recovery wells screened 5-70 ft BGS, Plus two 5-inch recovery wells for hydraulic control, screened 30-70 ft BGS. Groundwater recovery is via 1/3 HP Grundfos electrical submersible pumps. Design pumping rate is a minimum 5 gpm at 90 ft TDH. Total groundwater flow rate was expected to be 16 gpm, maximum 20 gpm. Produced water is treated in a low-profile tray air stripper and then treated in two 90 lb. liquid phase GAC units. Treated water is discharged to the sanitary sewer. SVE: The SVE system consists of a 50 HP blower designed to operate at an extraction rate of approximately 480 SCFM at a vacuum of 16 inches of mercury. Extracted vapors are treated in two 2000-plund vapor phase GAC units.

#### **Results and Next Steps:**

**Results to date:** After one year of operation, an estimated 345 pounds of chlorinated ethenes have been recovered. Approximately 90% of this contaminant mass was recovered from soil vapor. Approximately 1.6 million gallons of groundwater has been recovered and treated. Drawdown in the recovery wells averaged 8.5 feet versus a design drawdown of 8 feet. Groundwater recovery rate averaged 3.8 gpm versus a design rate of 16 gpm. SVE total flow rate was approximately 612 scfm versus a design rate of 480 scfm. Vacuum in the recovery wells generally ranged from 10 to 16.5 inches of mercury versus a design rate of 14 inches.

One of the recovery wells produced very little groundwater and was shut in.

Except for one well, contaminant concentrations in groundwater samples produced by recovery wells are the same order of magnitude since system startup with contaminant concentrations in 4 of the 6 recovery wells ranging from 1,300 to 4,300 : g/L PCE. PCE concentrations in groundwater samples collected from monitor wells however, have dropped by one order of magnitude - from 10s of mg/L to less than 10 mg/L.

The SVE system operation rate has been 73% and the groundwater recovery

system operation rate has been 87%. Downtime has been due to power interruptions, air stripper upsets and broken drive belts on the SVE system.

Hydraulic capture of the contaminant source area has been achieved.

**Next Steps:** An additional recovery well will be installed outside the rear door the drycleaning facility. There is a proposal to install monitoring point clusters to evaluate the spatial extent of vacuum in the vadose zone. There is also a proposal to cycle the SVE system on a monthly basis.

**Costs:**

**Cost for** \$147,800

**Assessment:**

**Cost to Design** \$298,500

**and**

**Implement:**

**Cost for** \$64,500 (includes monitoring & utility payments)

**Operation and**

**Maintenance:**

**Total Costs  
for Cleanup:**

**Lessons Learned:**

1. In low permeability sediments, considerable contaminant mass can be trapped in the unsaturated zone, capillary zone and the upper most portion of the saturated zone.

**Lessons  
Learned:**

2. A seasonal rise in the water table at the site resulting in an order of magnitude increase in contaminant concentrations in monitor well groundwater samples indicates the presence of DNAPL in and near the capillary zone at the site.

**Contacts:**

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**Site Specific References:**

Site Assessment Report - June 2001  
**Site Specific** MPE Pilot Test Report - May 2002  
**References:** Remedial Action Plan - March 2003  
Remedial System 1st Annual Progress Report - January 2005

**Images:**

**Images of  
Site:**

Profile last updated on Jan 24, 2005