

## CASE STUDY - CHLORINATED SOLVENTS

Client: Industrial Client, Pennsylvania

**Workscope:** Investigation, Design/Construct/Build large-scale SVE remediation system and dual phase (high vacuum) remediation system

### Regulation:

EPA Region I I I RCRA Corrective Action

### Site Concerns:

Halogenated VOCs (TCE and PCE) were found in the shallow and deep groundwater zones and in the soils at the facility. A groundwater withdrawal system had been operating for years. Deep bedrock (Brunswick Formation) had been impacted

### Project Value:

\$400,000 to date;  
\$50,000/year operating budget

### Goal:

Project Closure -  
Attainment of RCRA Standards for TCE

### Project Team:

Paul Miller, Bill Smith,  
Joe Rossi, Andrew Applebaum

### Geology:

Fractured Bedrock (Brunswick Formation)



### Solution:

Implementation of a shallow zone dual phase remediation system to compliment the deep groundwater withdrawal system. Also, design a SVE system to remove a large volume of TCE in the deep bedrock aquifer. The shallow zone dual phase remediation system was in operation at the site from January 1997 through December 1998. Successful extraction of TCE in the vapor phase, and substantial removal of perched groundwater containing an unknown amount of TCE resulted in closure of the IM remedial action in the SWMV-18 area. The EPA accepted the SVE design / Corrective Action Plan for the impacted deep bedrock in 1999. The pilot in situ high-vacuum SVE was installed in 5 existing deep wells located within the plant building and operated from February 2000 through April 2004. The extracted soil gas was treated by an on-site regenerative carbon system. Over 6,400 pounds of TCE was recovered and recycled into the plant's process stream.

### Innovation:

- Pilot test SVE system to remove DNAPLs in fracture zones above groundwater tables. Designed, installed, and operated SVE system in onsite deep wells.
- Utilized Geophysical Mapping techniques to identify specific fractures requiring treatment
- Secondary benefit includes historical low dissolved concentrations on monitoring/production wells within area of influence from SVE system. Core area monitoring well went from >30 ppm TCE prior to start-up to <1 ppm TCE.
- Designed, installed, operated and achieved closure with a dual-phase extraction system in low permeable clays to protect storm sewer and remediate localized contamination.
- TCE was recovered and recirculated back into the plant's process stream from soil gas via on-site dual phase extraction system and regenerative carbon.

