



## Chlorofluorocarbon (CFC) Remediation Case Study 2002

### Northern California

#### Project Description

The project site is located in Northern California and was leased and operated as a chemical storage and solvent recovery operation from late 1972 through April 1993. During an earlier period, the site may also have been used as a waste transfer station. Previous investigations indicate that soil and groundwater at the site, and groundwater down-gradient (westward) from the site, have been impacted by halogenated solvents and chlorofluorocarbons (CFCs).

#### Site Geology

Based on soil boring logs, shallow site stratigraphy consists of the following units:

- Dry fill material from the surface to approximately 2 to 4 feet below ground surface (bgs). This unit may be absent in offsite areas.
- Moist or damp silty clay from the base of the overlying fill materials to depths of 11 or 12 feet bgs. This unit is interpreted to be the top of the Newark Aquiclude.
- Saturated, primarily silty sand (referred to as the “Shallow Groundwater Zone” or SGZ) from 11 or 12 feet bgs down to depths of 18 to 30 feet bgs. This unit is apparently a relatively high perme-ability unit within the Newark Aquiclude.
- Clay from approximately 30 feet bgs down to depths of 43 to 49 feet bgs. This clay unit forms the lower portion of the Newark Aquiclude.
- Saturated sands, silty sands and silts of the Newark Aquifer are first encountered at depths ranging from 43 to 49 feet bgs.
- The relatively high permeability unit (approximately from 11 or 12 feet bgs down to depths of 18 to 30 feet bgs) is referred to as the Shallow Groundwater Zone. In borings penetrating the Shallow Groundwater Zone, flowing groundwater is typically first encountered at approximately 11 feet bgs.
- Static water levels generally equilibrate at depths of 5 and 7 feetbgs, and vary seasonally by a few feet.

#### Contaminants of Concern

Contaminant	Maximum Concentration
CFC-12	86ppmV
CFC-113	44,000ppmV
PCE	9,800ppmV
TCE	68,000ppmV
MC	20,000ppmV
1,1,1 TCA	19,000ppmV
1,1 DCA	180ppmV
1,1 DCE	8,500ppmV
cis-1,2 DCE	2,000ppmV



## Vapor Treatment System Design

- 100 SCFM system
- Sixteen vapor extraction wells were operated in cycles
- Maximum initial concentration achieved was 8,068ppmV

## Performance and Results

Using a G.E.O. refrigerated condensation unit for soil vapor extraction, 4,680 pounds of chlorinated solvents were recovered in 30 months.

**Mass Removal in Extracted Soil Vapor**

