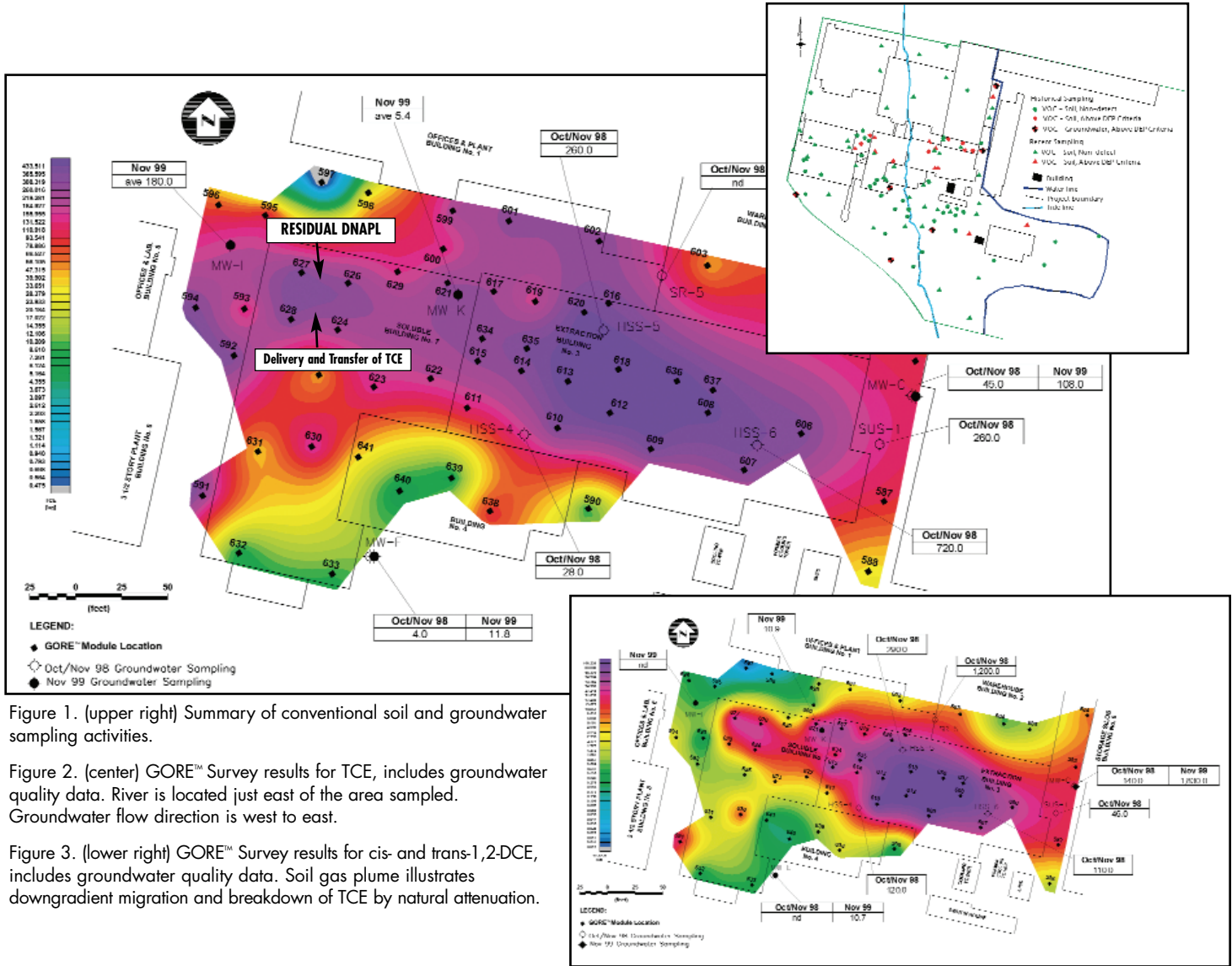


GORE™ SURVEYS

ENVIRONMENTAL SITE ASSESSMENT



Brownfields Remediation: Finding The Real Contaminant Source



Survey Summary

Location: Mid-Atlantic US

Property: Former coffee processing facility

Objective: Delineate the nature/extent of subsurface contamination

- Chlorinated solvents (TCE) used in decaffeination process
- GORE™ Survey located previously undetected DNAPL source area
- Survey results compared well with groundwater data
- Natural attenuation was observed

Survey Objective

Despite repeated widespread conventional soil and groundwater sampling over several years, unknown sources of chlorinated solvents were still believed to exist at this Brownfields site. A GORE™ Survey was conducted to aid in the identification of undetected sources.

Site Background & Geology

- Former coffee processing facility 1930s – 1980s, Mid-Atlantic region, US
- TCE used in decaffeination process
- Multiple solvent handling operations
- Relatively flat floodplain along a tidally influenced river
- Bedrock at depths to 30 ft. (west), sharp dip to 60 ft. along river (east)
- Unconsolidated fill materials overlying silty sand; glacial till on the bedrock
- Known contaminant plume in the unconsolidated zone groundwater

Previous Investigations

- 1993, 1994, and 1998 – conventional soil and groundwater sampling (Fig. 1)
- AOCs identified – chlorinated and petroleum-related compounds, PCBs, metals
- 1999 – new consultant conducts additional soil and groundwater sampling; GORE™ Survey

GORE™ Survey

- 58 GORE™ Modules over 2.5 acres
- Regular grid pattern, 50 to 75 ft. spacing, 3 – 4 ft. deep
- 10-day exposure
- Modified EPA method 8260/8270 GC/MS analysis at Gore labs

Survey Results

The GORE™ Survey illustrated well defined soil gas plumes for TCE and cis- and trans-1,2-Dichloroethene (Fig. 2 and 3). Though undetected in earlier site investigations, a source was identified by the GORE™ Survey near the west end of the surveyed area. Historically, TCE was delivered to this location in support of the site activities. The presence of cis- and trans-1,2-DCE – TCE “daughter” compounds -- helped to confirm that natural attenuation was taking place in the subsurface. (Petroleum-related compounds were also detected in the soil gas, but were not mapped.)

Survey Conclusions

Based on the GORE™ Survey data, and available historical information, the consultant concluded that residual DNAPL was present and moving downgradient, spreading laterally at the tidal boundary, and exiting into the river. As TCE was spilled, it was believed to have migrated vertically due to gravity and encountered dense till and bedrock at approximately 31 feet of depth. The TCE continues to dissolve into the groundwater, and move east towards the river at depth. The distribution of cis- and trans-1,2-DCE downgradient of the source area supported this conclusion, and provided additional information regarding the natural breakdown of the chlorinated compounds. The soil gas and groundwater quality data compared well at most sample locations.

The GORE™ Survey provided a critical level of site characterization, instrumental in identifying a small source area that was continuing to impact the groundwater. The soil gas data and plume orientations matched the known or suspected fate and transport of the solvents; and also provided information regarding the presence and process of natural attenuation, which has been adopted as the site remedy. The cultural use of the site was still under negotiation at the time of this writing.

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