

LARGE SCALE SITE ASSESSMENT: PINPOINTING THE PROBLEM = ROI

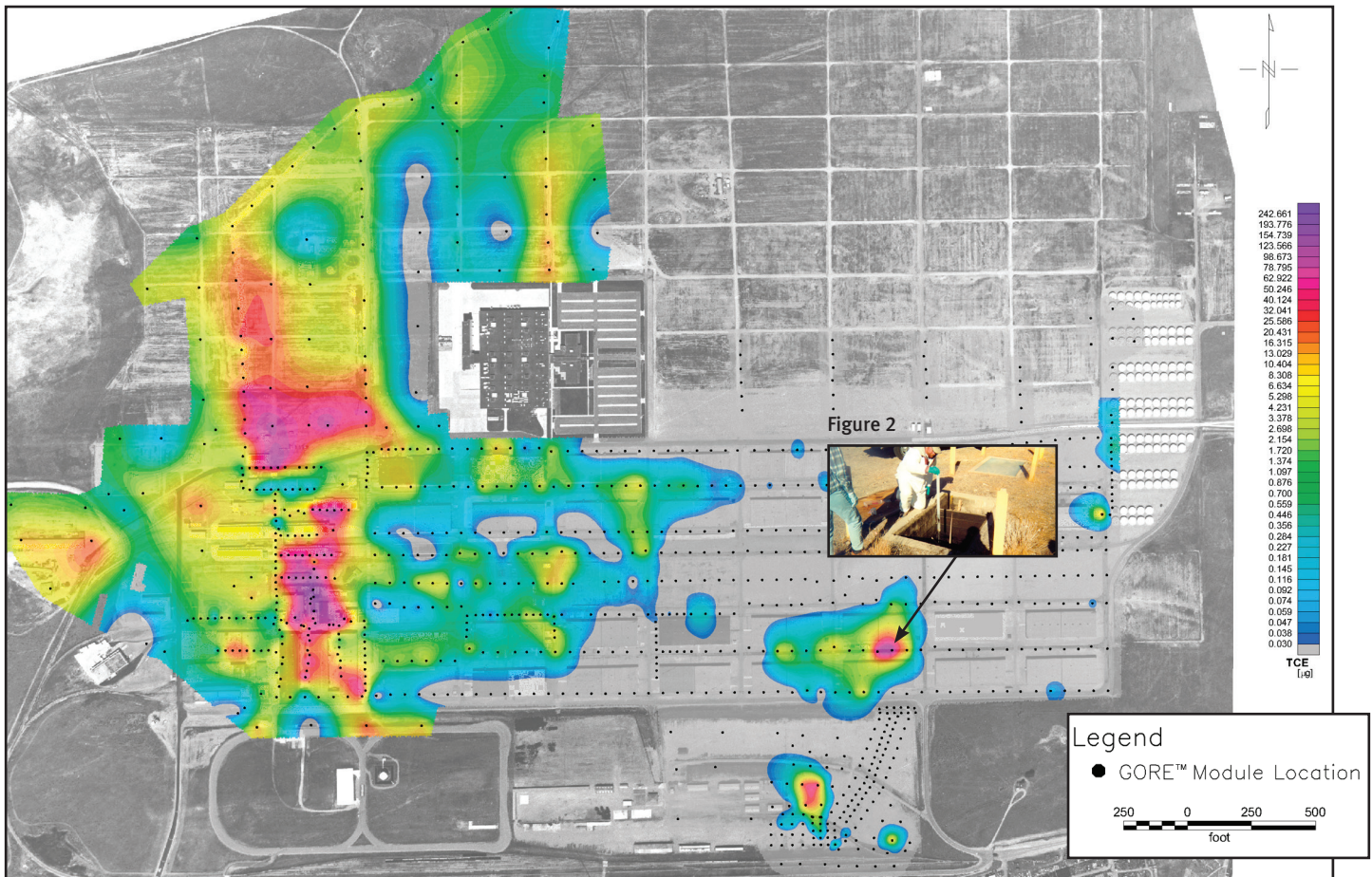


Figure 1. AGI Survey results - TCE.

Figure 2. Location of oil/water separator.

Survey Summary

Location: Western US

Property: Military site

Objective: Identify unknown source of TCE impacting groundwater

- Contaminant levels in groundwater stable despite ongoing pump and treat
- AGI Survey located source in soils below (unidentified) oil/water separator
- Remediation program modified
- Immediate decrease in TCE concentrations was observed
- ROI estimated to be in the millions of dollars

Survey Objective

Groundwater contaminant levels at this western US military site failed to decrease, despite an aggressive remediation effort. This suggested that not all source material had been located in the initial site assessment. The AGI Survey was employed to help pinpoint unidentified contaminant sources.

LARGE SCALE SITE ASSESSMENT: PINPOINTING THE PROBLEM = ROI

Site Background & Geology

- Military site, Western US
 - Large quantities of solvents had been used for equipment maintenance, ammunition demilitarization, etc.
 - On-site wastewater disposal
 - Trichloroethene - primary contaminant
- Groundwater depth: 100 to 400 ft.
- Poorly sorted silts, gravels and cobbles
- Conventional soil sampling - initial site assesment
- Remedial monitoring over several years showed no decrease in groundwater contaminant concentrations

AGI Survey

- >950 AGI passive samplers over 800 acres
- Regular grid, 50 to 300 ft. spacing, 3 ft. deep
- 14-day exposure
- Modified EPA method 8260/8270 GC/MS analysis at AGI labs

Survey Results

The AGI Survey identified a wide variety of volatile organic compounds on-site. Known or suspected source areas (Fig. 1) were confirmed despite the lack of data from the initial round of conventional soil sampling. Also identified was a previously unknown “hot spot.”

Mapping from the AGI Survey data facilitated the design of a targeted – and cost-effective -- subsurface investigation, which revealed a buried oil/water separator containing liquid sludge with high concentrations of TCE (26,000ppb; Fig. 2). The soil below the separator was contaminated with an estimated 6,000 pounds of TCE, and is now believed to be largely responsible for the high degree of groundwater contamination in this area.

Survey Conclusions

The AGI Survey confirmed suspected source areas, and also located sources that conventional soil sampling failed to identify. An oil/water separator was located, and it was determined that vadose zone soils beneath the separator were heavily impacted with TCE and other compounds.

A soil vapor extraction system was established near the separator. After six months of operation, approximately 3,900 lbs. of TCE had been removed, and TCE concentrations decreased by ~1,700ppb in nearby wells.

Return on Investment

It was expected to take 30 years – and approximately \$60 million – for the site to meet acceptable regulatory levels, utilizing an aggressive pump and treat program. However, the remediation effort was based on findings from the original site assessment (soil sampling), which failed to find an unidentified source that was a persistent contaminant contributor to the groundwater.

The AGI Survey was able to pinpoint the problem. Now, instead of installing enough wells to monitor the entire 800-acre property, well placement could be focused, dramatically reducing the number required. At \$60,000 per well (plus long-term operating, maintenance and monitoring costs), savings as a result of the AGI Survey are estimated to be in the millions of dollars.



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