

Assessment and Remediation

Electrical Component Manufacturing Facility, Oconee County, South Carolina

SITE DESCRIPTION

Trichloroethylene (TCE) was released from a former aboveground storage tank at this active manufacturing facility, and impacts were identified in soil, groundwater, and surface water. The impacted aquifer zones consist primarily of tightly fractured bedrock in the source area and alluvium, saprolite, and bedrock in the lower portion of the site. Multiple phases of investigation and remediation have significantly improved environmental conditions at the site.

ROGERS & CALLCOTT SERVICES

Site Investigation: A site investigation has been conducted in multiple phases. Some of the methods used include direct push soil and groundwater sampling, soil gas sampling, well installation, packer testing, slug tests, step-drawdown tests, 72-hour pumping tests, surface water and sediment sampling, stream flow measurements, fracture trace analysis, groundwater and bedrock surface mapping, evaluation of vertical and horizontal groundwater and contaminant movement, determining aquifer characteristics and pumping well capture zone, evaluating aquifer geochemistry and interplay among precipitation, surface water, and groundwater flow and quality, and groundwater flow modeling. Thorough site characterization was critical in designing cost-effective interim and final remedies designed to address the site-specific geologic features and flow regimes.

Hydraulic Barrier System: After evaluating several alternatives, Rogers and Callcott designed a hydraulic barrier system that has been successful in mitigating contaminant migration into the surface water. The system consists of groundwater recovery wells and treatment by air-stripping. In addition to design engineering, our role included the following.

- Obtaining permits for all aspects of the project
- Bidding for construction
- Contract document preparation
- Contract management
- Construction observation
- Engineering certification
- System performance evaluation
- Groundwater, surface water, and sediment sampling and analysis
- Oversight of system operation
- Data evaluation and reporting



The resulting system is effective in achieving its remedial goals through the use of state of the art data recording and communication technologies to function in sync with changing aquifer conditions as they are significantly affected by precipitation and surface water flow.

Soil Vapor Extraction: A soil vapor extraction (SVE) system was installed in and around the source area following investigation and pilot testing. The full-scale system consists of 10 SVE wells, 24 monitoring points at three depths, over 1,200 feet of piping, and a positive displacement blower. More than 2,500 pounds of TCE were removed by the SVE system before it met the remediation goal and was shut down with SCDHEC concurrence in 2014.

Assessment and Remediation

Electrical Component Manufacturing Facility, Oconee County, South Carolina

Enhanced In-Situ Bioremediation: Following successful pilot studies for bioremediation in both bedrock and saprolite, four enhanced in-situ bioremediation barriers have been installed at the site to decrease the remediation timeframe—two in the source area, one mid-plume, and one near a property boundary. Combined, the barriers span approximately 600 feet in length and consist of 44 bedrock injection wells and 36 saprolite injection wells. Cultures of *dehalococoides* were injected to augment the microbial community, and a mixture of HRC Primer, HRC X, HRC, and/or 3DMe were injected into the subsurface to stimulate microbial activity. Reducing conditions were established quickly, and contaminant concentrations have decreased substantially.



DNAPL Recovery: Free-phase TCE (DNAPL) was discovered while drilling a bedrock injection well in the source area in 2016. We took immediate action to pull all recoverable DNAPL from the well using a bottom-intake pump. Surrounding wells were also assessed for the presence of DNAPL, and injections were delayed until no additional free-phase TCE was flowing to the wells. Approximately 3 months after injection, DNAPL was identified in a performance monitoring well, approximately 10 feet downgradient of the effected injection well. We used downhole video and a FLUTE liner to identify the DNAPL-bearing fractures and used a packer to isolate said fractures from the rest of the well. Using a bottom-intake pump, we removed more than 10 liters of free-phase TCE from bedrock at the site. No additional DNAPL has been observed since late 2017, and contaminant concentrations have been declining rapidly.

