

Innovative Technology Powers “Greener Remediation” at State Road 114 Superfund Site, Levelland, Texas

The promotion of greener remediation, including the use of renewable energy to power cleanups at Superfund sites and other cleanup sites, is a prominent goal of EPA’s Land Revitalization and Superfund Programs. EPA Region 6 is testing a new and innovative technology to power greener remediation at the State Road 114 Superfund site in Levelland, Texas, where cryogenic technology was installed to treat contaminated groundwater.

The State Road 114 Superfund Site consists of 1 ½ by 1 mile contaminant plumes that extend from the 64-acre former Motor Fuels Corporation Refinery to the Levelland municipal park. The benzene and 1, 2-dichloroethane (DCA) plumes penetrated the Ogallala aquifer—the only source of high-quality drinking water in the area—and contaminated 28 private residential wells. In addition to drinking water, the aquifer supplies water to municipalities and is tapped for irrigation across West Texas. At 19,000 and 380 parts per billion (ppb), respectively, benzene and DCA levels far exceed the 5 ppb drinking water maximum contaminant level set by EPA.

A partnership between Region 6 and the Texas Commission on Environmental Quality led to the completion of remedial design and remedial action construction in 2009 that included the installation of an innovative cryogenic technology to treat contaminated groundwater. The technology uses cryogenic compression and condensation equipment to recover contaminant vapor as a liquid for potential recycling or resale through soil vapor extraction (SVE) and air stripping systems. A fuel tanker then transports the recovered hydrocarbon to a fuel facility where it is mixed with oil blend stock to produce a low-grade fuel and is ultimately traded as a commodity on the open market.

The innovative technology recovered more than 99 percent of the volatile organic compounds in the vapor stream. The treatment system recovered over 110,000 gallons of refined condensate from beneath the refinery that was contributing to the groundwater contamination. The groundwater treatment system also recovered and treated over 27 million gallons of water that was injected back into the Ogallala aquifer. Over time, the SVE system is expected to recover 285,000-570,000 gallons of hydrocarbon material.

Recoverable vapors at the site are being produced from the 124 SVE wells and the groundwater air stripper treatment unit. Integration of the cryogenic process is anticipated to decrease the time needed to reduce the source zone by five years. Region 6 estimates an annual electricity cost of \$129,600 for operation and maintenance of the cryogenic process, based on an annual demand of 185,000 kWh each year.

This innovative green technology eliminates air emissions, allows for accelerated recovery and cleanup, and reduces the carbon footprint for entire site cleanup. The site is currently in the first year of the 10-year, long-term remedial action that started in September 2010.



State Road 114 Superfund Site