



FACT SHEET



Pinellas Environmental Restoration Project: Groundwater Remediation at the 4.5 Acre Site at the Young-Rainey STAR Center, Largo, Pinellas County, Florida

The U.S. Department of Energy (DOE) is performing ongoing remediation of contaminated groundwater at the 4.5 Acre Site adjacent to the Young-Rainey Science, Technology, and Research (STAR) Center. This cleanup is being conducted as part of the Pinellas Environmental Restoration Project that is managed by the DOE Office of Legacy Management.

Background

The 4.5 Acre Site was formerly a part of the U.S. Department of Energy (DOE) facility located in Largo, Florida, now known as the Young-Rainey Science, Technology, and Research (STAR) Center (Figure 1). The 4.5 Acre Site was sold to a private entity in 1972. DOE currently leases the 4.5 Acre Site while groundwater remediation is ongoing.

During the period of DOE ownership, the 4.5 Acre Site was used for disposal of drums containing waste resins and solvents that resulted in contamination of the groundwater in the sandy, shallow surficial aquifer. The major contaminants, based on toxicities and concentrations, are trichloroethene, dichloroethene, vinyl chloride, and benzene. The drums and the contaminated soil were removed in 1985.

Remediation Activities

In 1990, a groundwater extraction and treatment system was put into operation at the 4.5 Acre Site. Contaminated groundwater at the 4.5 Acre Site was extracted through seven recovery wells. The extracted water was treated with an air stripper to remove the volatile organic compounds, and the treated water was discharged to a publicly owned water treatment system. This treatment reduced the size of the contaminant plume and contained it within the boundaries of the site. By 1997, however, concentrations of contaminants in the surficial aquifer were no longer being effectively reduced by extraction and treatment with the air stripper.

A dual-phase extraction system was installed at the 4.5 Acre Site in 1997 to replace the groundwater-extraction system. The dual-phase system consisted of a vacuum pump linked to 22 extraction wells. The dual-

phase aspect of the system referred to the capability of the system to recover both water and vapor (two carriers of the contamination) from the subsurface. The dual-phase system was an improvement compared with the groundwater-extraction system because it used a vacuum to help move the groundwater and recover vapor from subsurface areas not reached by the groundwater-extraction system.

By the end of 1998, the dual-phase system had treated approximately 9.45 million gallons of contaminated groundwater. This system was effective at removing high concentrations of contaminants, but it became less effective as contaminant concentrations decreased.

To treat the remaining low contaminant concentrations, DOE selected a type of enhanced bioremediation called biosparging. Bioremediation helps naturally occurring subsurface microorganisms break down organic compounds to the harmless components carbon dioxide and water.

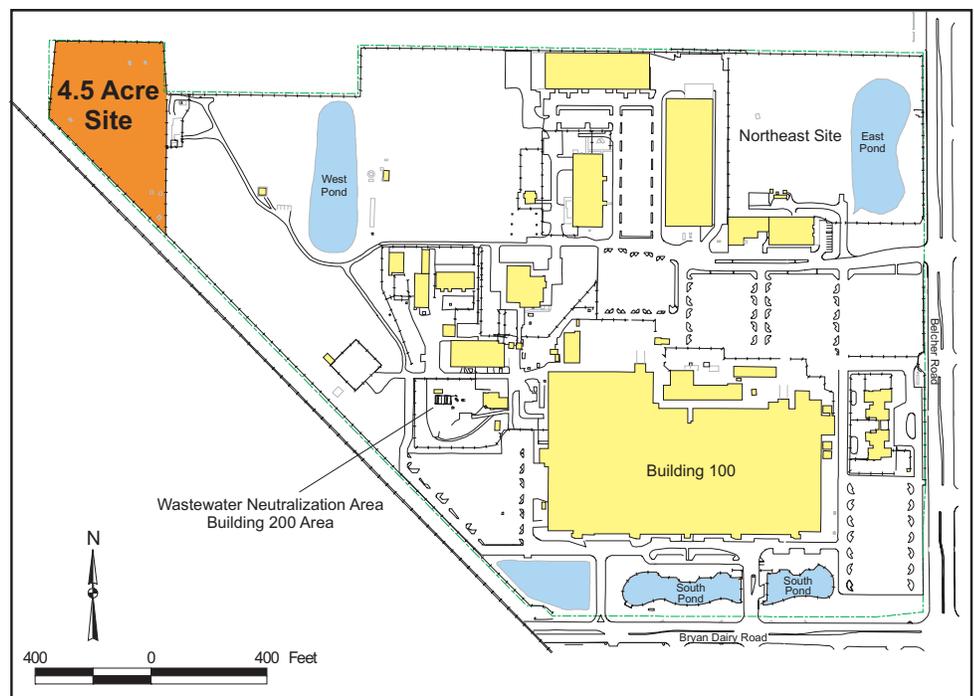


Figure 1. Location of 4.5 Acre Site

A biosparging system, consisting of three horizontal wells, each 500 feet long, was installed at the 4.5 Acre Site in late 1999 to enhance aerobic bioremediation, which takes place in the presence of oxygen. The system injects air into the subsurface; the air passes through the groundwater and provides an oxygen-rich environment for the aerobic microorganisms, increasing their ability to break down organic compounds that contaminate the site.

However, unforeseen subsurface conditions limited the effectiveness of this system. Preferential pathways in the subsurface caused the injected air to contact only a very small portion of the contaminated area, and very high oxygen demands in the aquifer matrix used up most or all of the oxygen in the injected air before aerobic conditions could be attained. The biosparging system was shut down in May 2003. Low levels of contamination remain in the subsurface.

Current Activities

An interim measure consisting of groundwater recovery and treatment with an air stripper is being implemented to control the contaminant plume while a new remediation technology is being chosen and implemented to replace biosparging. Because the contaminants in the groundwater are volatile, meaning that they tend to leave the water and move into the air, the groundwater is piped to the air-stripper treatment system (Figure 2). The groundwater is pumped to the top of the air stripper and allowed to flow down through several shallow trays. A blower forces air up through holes in the trays. The air flow strips contaminants from the groundwater and discharges them out the top of the unit. Subsequently, the contaminant vapors are rapidly degraded or broken down into harmless compounds by ultraviolet rays from the sun.

This interim groundwater treatment system will operate until the final remediation system is implemented. Remediation will continue until the groundwater cleanup requirements are met.



Figure 2. Air Stripper at 4.5 Acre Site

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Additional information and fact sheets about the Pinellas Environmental Restoration Project at the Young-Rainey STAR Center are available on the Internet at <http://www.gjo.doe.gov/LM/sites/maps/fl/pinellas/pinellas.htm>.