

Tibbetts Road Site Barrington

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The Tibbetts Road site is located in a rural residential area of Barrington just south of Swains Lake. In addition to maintaining a residence at the site, the property owner collected and stored flammable hazardous wastes in drums on the property and used this waste to help burn out the interiors of junked automobiles, which were subsequently sold for scrap. The wastes included various solvents, automotive fluids, petroleum products and PCBs. Dioxins and furans were detected in the soils at the site and are thought to have formed as a combustion byproduct of PCBs.

The site was discovered by NHDES in 1982 following a complaint from an abutter. Sampling of residential water wells in the area indicated the presence of volatile organic constituent (VOC) contamination at relatively high levels. In 1984, EPA and NHDES conducted an emergency response action to remove the drummed wastes from the site. That same year, NHDES began a hydrogeological study to evaluate the extent and nature of groundwater contamination. Several plumes of contamination were found to be emanating from the site. The site was added to the National Priorities List in June 1986.

In 1986, the State and EPA excavated and transported PCB and VOC contaminated soils off-site to a secure out-of-state hazardous waste disposal facility. Dioxin contaminated soils were treated on-site using an infrared thermal treatment process.

As an interim groundwater measure, the affected residences were supplied with bottled water, first by the town of Barrington, then by NHDES. Through cooperative federal, state and local efforts, an emergency water supply system was subsequently constructed. Funded with federal Superfund money, the project included: the construction of an infiltration well system; a pump station; and a storage facility adjacent to Swains Lake, which served as the water source. The water supply system is designed to service up to 70 residences in designated risk areas and is managed by the Swains Lake Village Water District (SLVWD).

The remedial investigation/feasibility (RI/FS) study of the site was completed in 1991. Based on the findings of that study, a Record of Decision (ROD) was issued in September 1992 that included: upgrading the existing drinking water treatment and distribution systems; capturing and treating highly contaminated groundwater and soil vapors; and discharging treated groundwater into the overburden and bedrock aquifers.

A Vapor Extraction and Groundwater Recovery (VER) system was constructed in the spring of 1995 to remove soil and groundwater contaminants. The system was in operation for three years during warm weather conditions, ending in December 1997.

Phytoremediation was implemented in the spring of 1998. Phytoremediation is a process that uses trees and plants to achieve or assist in the environmental cleanup of hazardous waste sites. The ultimate goal is to develop a system that is densely vegetated and deeply rooted with hybrid poplar trees that dewater the upper overburden deposits and maintain an aerobic environment.

The VER system was restarted in June 2000 to augment the phytoremediation effort. The VER system treated water from two on-site bedrock wells for seven to eight months of the year. The system was shut down and drained during the winter months due to the shallow burial of the piping network.

The first Five-Year Review Report for the site was completed in June 2003. The assessment of the Five-Year Review found that the remedies implemented at the site remain protective of human health and the environment and that progress is being made at the site to achieve the cleanup levels identified in the ROD.

A small portion of the weathered bedrock aquifer located to the northeast of the site has shown more limited progress in achieving the required cleanup levels. To see if the cleanup processes in this area can be accelerated, a pilot-test was performed during the fall of 2003 using in-situ chemical oxidation technology. An initial injection of sodium permanganate (20% solution) was applied to shallow bedrock from three injection/monitoring wells in early November 2003. A second injection was performed in late December 2003.

Following the analyses of pilot-test data obtained through the fall of 2004, it was observed that reductions in VOC concentrations in groundwater in the pilot-test area were significant. It was recommended that permanganate oxidation be used in other portions of the site. Injection of sodium permanganate commenced in late November and continued through early December 2006. Post-injection monitoring was conducted in December 2006 and monitoring results were evaluated in early January 2007. Based on the evaluation, it was determined that additional injections may be beneficial to further reduce VOC concentrations in the area. Injections were performed in early summer of 2007 and continued through 2008.

EPA and NHDES conducted a Five-Year Review inspection of the site in the spring of 2008. During the review, potential vapor intrusion pathways were evaluated using both EPA and NHDES guidance. The second Five-Year Review Report was completed in the summer of 2008. The report identified potential future issues that may affect protectiveness; primarily that the water supply system that serves the residents surrounding the site has operational issues. The report concluded that the general deterioration of the surface water supply (Swains Lake) would likely compromise the ability of the water treatment system to deliver safe drinking water in the future.

The SLVWD explored alternatives for upgrading the existing treatment facility and for developing a new drinking water source for servicing the impacted area in the Tibbetts Road area. A Water System Evaluation Study was completed in July 2009. The study identified alternatives for upgrading the existing water system, including developing a bedrock groundwater source. A bedrock well installation and pumping test program was conducted during 2010 and the SLVWD water source was eventually transitioned from surface water to bedrock groundwater obtained from two new supply wells.

On-site investigation and monitoring activities conducted during 2011-2013, included the installation and sampling of additional bedrock monitoring wells, source area delineation and vapor intrusion studies. An evaluation of private wells in the newly constructed Cedar Creek Subdivision was also conducted and low level VOC impacts were identified in a number of wells. In-home point of entry water treatment systems were installed in homes that exhibited VOC levels either close to or in excess of groundwater quality standards.

Limited soil excavation to remediate remnant source areas in the overburden was conducted in June 2013. An in-situ chemical oxidation (ISCO) pilot test was conducted in the fall of 2013 to evaluate use of this technology to advance the progress of bedrock groundwater remediation. EPA also completed the third Five Year Review Report in August, 2013.

Along with routine groundwater monitoring activities, additional bedrock investigation and pilot testing was conducted in 2014 in advance of the proposed implementation of a bedrock ISCO remedy. The planning of a water main expansion to provide the Cedar Creek Subdivision with municipal water was also initiated in the fall of 2014 and the design and construction of the water main was completed in 2015.

The Fourth Five-Year Review was completed in August 2018 and concluded that the remedial actions taken to date remain protective of human health and the environment in the short-term. To be protective in the long-term, sampling for the presence of the emerging contaminants PFOA, PFOS, and PFBS (collectively known as per- and polyfluoroalkyl substances, PFAS), was determined to be necessary. In addition, the continued evaluation of innovative remedies to accelerate the reduction of bedrock groundwater concentrations was also recommended. A representative number of Site monitoring wells were sampled for PFAS in November 2018. Low levels of PFAS were detected at several locations with concentrations below 10 ng/L for PFOA/PFOS combined (note the current ambient groundwater quality standard is 70 ng/L for PFOA and PFOS individually or combined).