



Pacific Coast Pipeline Superfund Site

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Construction of Groundwater Cleanup Remedy Begins

After overseeing the completion of the soil cleanup at the Pacific Coast Pipeline (PCPL) Site, a former refinery in Fillmore, California, the U.S. Environmental Protection Agency (EPA) is ready to start the next phase of cleanup. In October 2014 work will begin on the air sparging system, a treatment system that will help clean up benzene in the groundwater. This chemical is present in the groundwater due to historical refinery operations from the early 1900s to 1950.

What is Air Sparging?

Air sparging pumps air down through injection wells into groundwater to do two things. First, it provides oxygen to naturally-occurring bacteria, enabling them to quickly break down *volatile organic compounds*, or VOCs, such as benzene. Second, the addition of air makes the chemicals evaporate faster, which makes them easier to extract with another technology, such as *soil vapor extraction*, or SVE. Air sparging is used for chemicals that evaporate easily, like those found in solvents and gasoline. As air bubbles move through the groundwater, they carry contaminant vapors upward into the soil above the water table. In this deep soil VOCs can be broken down by other bacteria. If concentrations are high enough, VOCs are then pulled out of the soil for treatment using SVE (Figure 1).

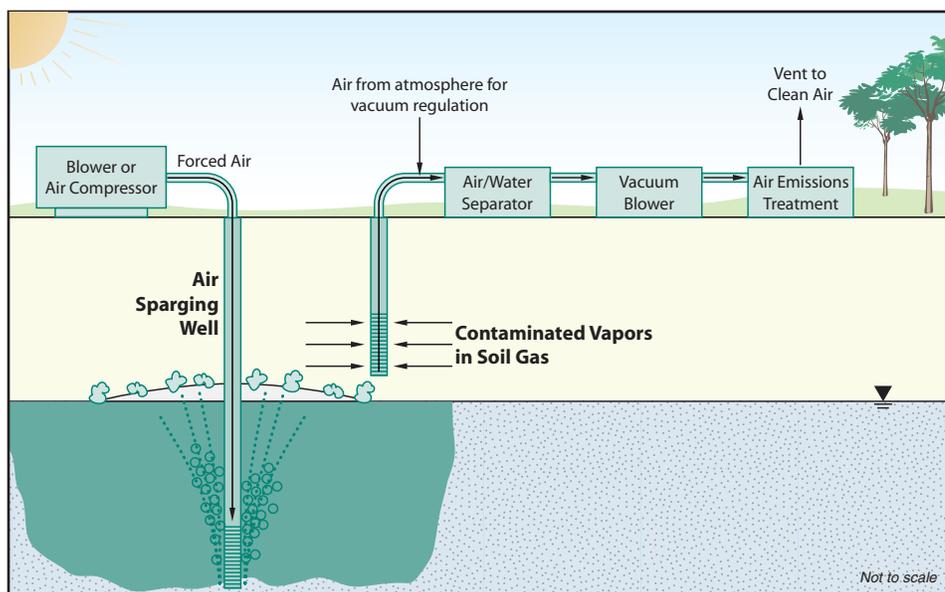


Figure 1: Air Sparging System

Quick Facts About the Groundwater Contamination

- » Two treatment systems operated from 1992 to 2002 to clean up two plumes of groundwater and soil vapor contaminated with benzene.
- » Approximately 2,711 pounds of benzene were removed.
- » These systems reduced the groundwater contamination but were unable to clean the groundwater to drinking water standards (one part per billion), so other cleanup options were evaluated.
- » In 2011 EPA selected air sparging as the next treatment to use for the southern plume (See Figure 1).
- » The highest concentration of benzene in groundwater is 160 parts per billion (ppb), down from 350 ppb in 2012.
- » The benzene contamination is approximately 60 feet below the ground.

Construction Work

Installation of the air sparging system will begin at the end of October 2014 and will be conducted in two phases. This treatment system involves the installation of three types of wells: *air sparging wells* that will inject air into the groundwater; *soil vapor monitoring wells* that will detect benzene vapors in soil; and *soil vapor extraction wells* that will capture benzene vapors coming up from the groundwater. If soil vapor concentrations are low, the soil vapor extraction wells will not operate because the benzene will naturally break down in the deep soil. During Phase 1, approximately nine sparging wells will operate at the southeast end of the Site. Ten soil vapor monitoring wells will be installed and monitored during this phase and three vapor extraction wells will be installed. Phase 2 will begin nine months later on the west side of Pole Creek and will add wells to enhance the cleanup system performance (Figure 2). However, if the Phase 1 system is able to reduce benzene in groundwater to 100 ppb or less, Phase 2 will not be implemented. Work will be conducted from 7:30 a.m. to 5:30 p.m. on weekdays. Odor reduction measures will be implemented.

Site Background

A refinery operated at the Pacific Coast Pipeline site from 1915 to 1950. Refinery activities resulted in contaminated soil and groundwater. EPA placed the site on the Superfund list in 1989 and began cleaning up the benzene in groundwater in 1992 with two treatment systems, one to pump and treat

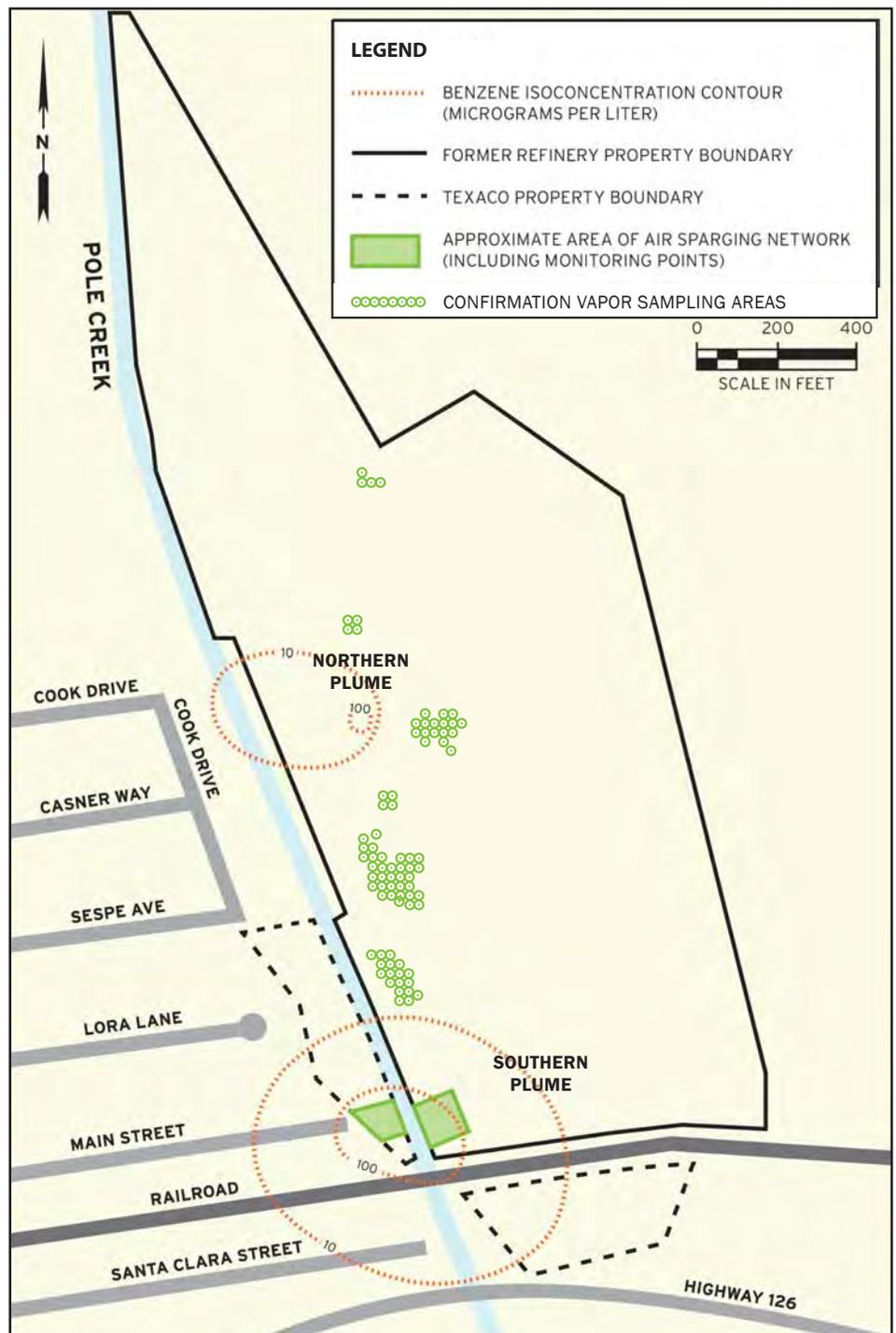


Figure 2: Confirmation Vapor Sampling Locations and Air Sparging Network (Air sparging in southern plume only)

Your Drinking Water is Safe



Drinking water for Fillmore residences and businesses comes from groundwater wells near Sespe Creek. This water is regularly tested to make sure it meets all state and federal drinking water standards. The benzene in groundwater at the PCPL site is 60 feet below ground and has not traveled far from the former refinery property. Groundwater from the site does not move toward the city wells and does not affect the safety of the city water supply.

the groundwater and one to remove benzene from the vapor in soil. These systems reached the limits of their effectiveness in 2002 and were shut off. EPA evaluated other options to clean up the remaining benzene and selected three different methods that will be implemented sequentially: air sparging, groundwater circulation, and monitored natural attenuation. From 2013 to 2014 soil contaminated with lead and petroleum chemicals was excavated and replaced with clean fill. The site drainage features required by Ventura County have been completed and the property is ready for commercial and recreational use.

Additional Upcoming Site Activities

Soil

EPA has directed Chevron to conduct soil vapor sampling to confirm that the site soil meets the EPA cleanup standards for VOCs. At the end of October 2014 vapor samples will be collected from approximately 80 locations on the site (Figure 2). Sampling will be done with a drill rig on a small truck.

Groundwater

There are two plumes of contaminated groundwater (Figure 3). Air sparging will be used only in the southern plume where the concentrations of benzene remain high. In the northern plume the concentrations of benzene are low enough that treatment is not effective. Monitored natural attenuation, which involves the breakdown of benzene by bacteria, is effectively reducing the concentration in this plume. Groundwater sampling continues on a semi-annual basis. The next sampling will be conducted in November 2014.

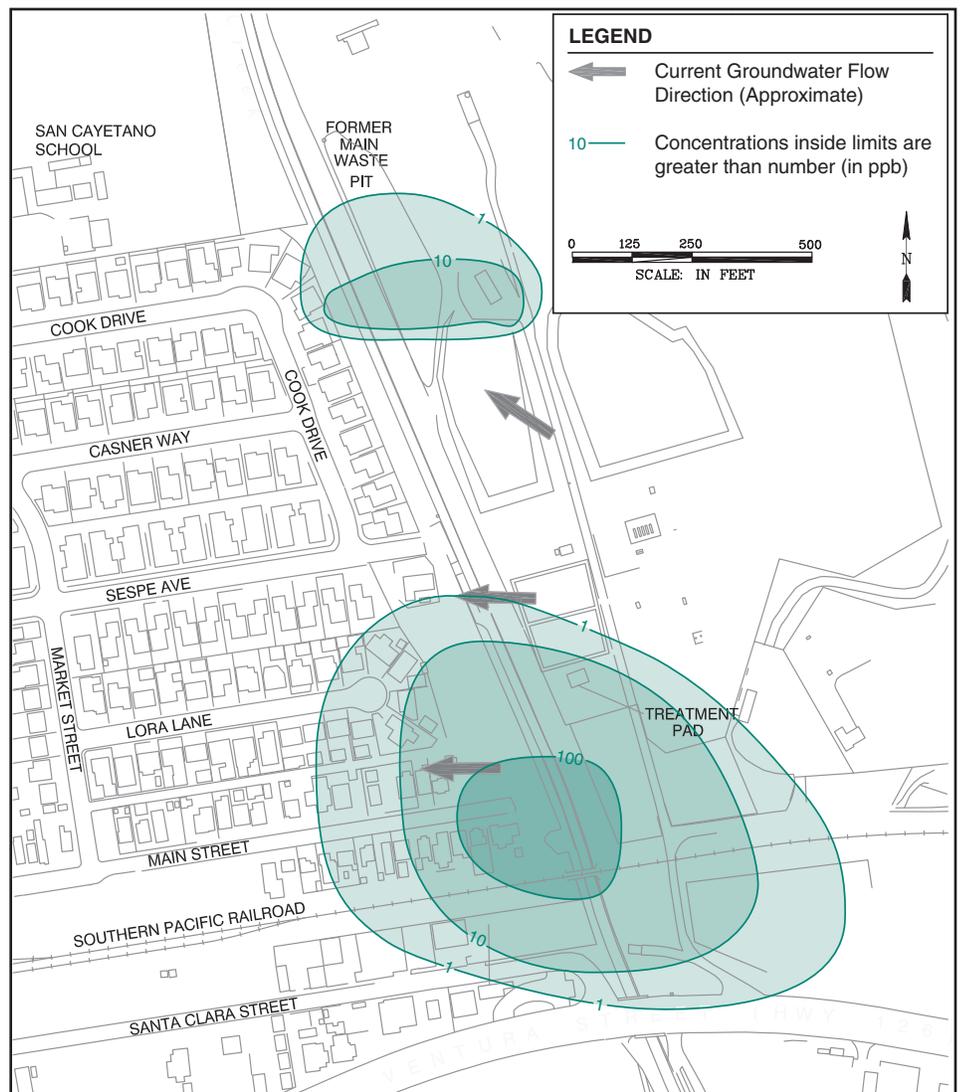


Figure 3: Benzene Contamination Plumes

What About the Odor?

During the site cleanup, petroleum odor sometimes made its way into the neighborhood. The primary chemical responsible for this smell is naphthalene. This odorous chemical can be smelled at levels well below those expected to cause adverse health effects. Site air monitoring has consistently confirmed that the concentrations of this chemical were below a level that could be a threat to health. As there are low concentrations of petroleum remaining in the soil, future excavation work might release low levels of naphthalene vapors that can be smelled. For more information on environmental odors, please visit the government website: <http://www.atsdr.cdc.gov/odors/>

What About Surface Water Runoff?

The current site drainage plan, approved and permitted by Ventura County, calls for runoff during heavy rains to drain to Pole Creek. Past runoff sampling showed no contamination entering Pole Creek.

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For More Information about the Site Cleanup

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