



U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, Maryland 21203-1715

Phytoremediation Study Spring Valley Formerly Used Defense Site

Background: The Spring Valley Formerly Used Defense Site consists of approximately 661 acres in the Northwest section of Washington, D.C. During the World War I era, the site was known as the American University Experiment Station and was used by the U.S. government for research and testing of chemical agents, equipment and munitions. Today, the Spring Valley neighborhood encompasses approximately 1,200 private homes, including several embassies, as well as the American University and Wesley Theological Seminary. The U.S. Army Corps of Engineers is the Defense Department's agent for the Spring Valley cleanup.

As part of that cleanup effort, the Corps, in consultation with its regulatory partners the Environmental Protection Agency and the D.C. Department of Health, developed a comprehensive soil sampling plan in 2001. The plan proposed the sampling for arsenic on every property in Spring Valley (1,200 residential properties and 400 non-residential lots), with more intensive sampling in select areas. Of the 1,602 properties and lots in the study area, 1,486 have been sampled for arsenic. (Rights of entry could not be obtained for those not sampled.) If a particular property had an elevated level of arsenic, a more detailed grid sampling procedure was done to identify areas of contamination. The results were evaluated to determine any elevated health risk. Working with EPA and D.C. Health, the Corps agreed on a cleanup goal of 20 parts per million, and 140 properties were identified that have one or more grids above that cleanup goal. Soil removal and backfilling are ongoing on these properties.

Removing soil with elevated arsenic levels involves ripping up yards with mechanical excavators, removing two feet of soil, the landscape and constructed features from the contaminated area. After removal, the soil, plantings, sidewalks, driveways, patios and walls are replaced. Each yard requires intensive interaction with its homeowners — information exchange, rights of entry, appraisals, negotiations and scheduling.

Phytoremediation study: Concurrent with the soil removal efforts, the Corps looked for other potential solutions to removing arsenic from contaminated soil in Spring Valley. The team pursued phytoremediation, the use of plants to remove contaminants from soil or water. It had been discovered recently in Florida that certain ferns removed arsenic from contaminated soil. The Corps' Engineering Research and Development Center, Vicksburg, Miss., conducted the initial greenhouse study during the winter of 2003-04. Several species of brake ferns were planted in soil obtained from Spring Valley. A normal moisture regime was tested, along with a high moisture regime. The plants were grown for four months in the greenhouse and then harvested. The biomass, the plant matter above the root, was collected from each individual plant and analyzed. It was determined that the wet treatment regime had a significantly higher increase in arsenic concentration than the normal, so the wet regime was selected for further testing.

Three Spring Valley locations — two private properties and a section along the fence bordering the Van Ness Reservoir — were identified for an onsite study during the 2004 growing season. The Corps contracted with Edenspace Systems, of Dulles, Va., to plant about 2,800 brake ferns called *Pteris multifida*, *Pteris mayii* and *Pteris vittata*. The contractor maintained the plants. Results of the study were encouraging. The plants grew well, and the roots expanded into the native soil. When they were harvested and tested in the fall, results showed that the ferns removed an average of about 9 parts per million of soil arsenic across all three sites. Some ferns were left in the ground to see if these species would survive over the District of Columbia winter, and there is evidence that many of those are coming back.

These potentially promising results led to an expanded test for the 2005 growing season. About 10,000 ferns were planted on 11 properties. Evaluation of the results will continue. The results will allow the partners to better evaluate the potential for phytoremediation in Spring Valley.

For more information about the Spring Valley phytoremediation study, contact Ed Hughes, project manager, (410) 962-6784; e-mail Edward.T.Hughes@usace.army.mil or Mary Beth Thompson, public affairs specialist, 410-962-4088; email Mary.B.Thompson@usace.army.mil.



U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, Maryland 21203-1715

Phytoremediation Study

Spring Valley Formerly Used Defense Site

The goal of the study is to learn whether phytoremediation could be a viable tool to help with removal of arsenic soil contamination in Spring Valley in areas of relatively low contamination or where soil removal is especially problematic.

For more information about the Spring Valley phytoremediation study, contact Ed Hughes, project manager, (410) 962-6784; e-mail Edward.T.Hughes@usace.army.mil or Mary Beth Thompson, public affairs specialist, 410-962-4088; email Mary.B.Thompson@usace.army.mil.