



Recommendation No. 154

July 23, 2002

Full-Scale Dynamic Underground Stripping (DUS)

Background

Dynamic Underground Stripping (DUS) is an integrated process combining the complementary benefits of different technologies. The first technology is steam injection. Steam is injected into a contaminated area to heat permeable subsurface areas to temperatures around 100° C (212° F). Volatile compounds that are bound to the soil are distilled from the hot soil and are moved to the steam/groundwater interface, where they condense and are pumped to extraction wells. Electrical heating can also be used on less permeable clays to vaporize contaminants and force them onto the steam zones for removal. Another component of DUS is underground imaging. An imaging system called Electrical Resistance Tomography (ERT) delineates heated areas to map the boundary between the contaminated zone and the cooler surrounding area. This technology helps monitor the cleanup and provides some process control. Oxygen can also be added to parallel the steam in a process called Pyrolysis. When steam injection is finished, the steam condenses and contaminated groundwater returns to the heated zone, where it mixes with oxygen-rich condensed steam. This enhances natural biodegradation of certain contaminants by providing nutrients to microorganisms that thrive at higher temperatures. (Ref.1)

This past year, the SRS conducted a demonstration project to determine the removal of volatile compounds and dense nonaqueous phase liquids (DNAPLs) by DUS in a small area of the A/M groundwater plume. The results of the demonstration project were very promising. DUS was quicker, more effective, and less expensive than alternative technologies for deep subsurface contaminant plumes. SRS predicts DUS to be 75 percent faster than pump and treat technologies. Based upon the results of this demonstration (Phase I), SRS plans to use DUS in a full-scale treatment project. As part of the Cleanup Reform Appropriations (CRA) proposal, SRS specifically identified DUS as an innovative technology for accelerated risk reduction and cleanup. (Ref. 2)

Comment

The SRS CAB commends SRS for using this promising innovative approach to tackle the difficult problem of cleaning up DNAPLs and supports the effort to use the technology on a larger scale. The SRS CAB is in favor of innovative technologies that reduce both cost and time to achieve cleanup. However, the SRS CAB is concerned about the potential elevated temperature of the soil and its long-term effects. In addition, to demonstrate the prudent use of taxpayer dollars, the SRS CAB would like additional information on the potential cost savings associated with using DUS over conventional remedial technologies.

Recommendation

The SRS CAB offers the following recommendations concerning DUS:

1. DOE provide the necessary funding to fully implement the DUS full-scale project at SRS and meet baseline schedules and milestones. The SRS CAB also requests DOE promote the exchange of DUS successes at other sites.
2. SRS provide information to the SRS CAB by December 31, 2002 on the effects of the elevated temperatures in the subsurface to the indigenous microorganisms in the soil and the length of time the soil may remain sterile and perform an analysis on the potential long term effects on the DUS project being considered under the CRA.
3. SRS provide an update on the post characterization to the CAB on Phase I in addition to periodic updates on the status of Phase II.

Agency Responses

[*Department of Energy-SR*](#)