

EXECUTIVE SUMMARY

An aeration curtain containing an air sparging and soil vapor extraction (AS/SVE) system was installed at Hill Air Force Base (AFB) Operable Unit 5 (OU 5), near the City of Sunset, Utah. The purpose of this system was to test the performance of an aeration curtain and assess its applicability for treatment of groundwater contaminated with trichloroethene (TCE). This report discusses system performance and fulfillment of the Treatability Study (TS) objectives as presented in the *Treatability Study Work Plan* (Radian, 1995a). The objectives and a status summary are provided below.

Technology Demonstration Objectives and Status

The primary goal of the performance evaluation was to evaluate the effectiveness and economy of AS/SVE technology, configured as an aeration curtain, for removing volatile organic contaminants (principally TCE) from the groundwater at OU 5. The following objectives were identified in the work plan as a basis for evaluating AS/SVE system performance and its applicability for treatment of contaminated groundwater at OU 5. The status of each objective is presented in italics:

- ▶ Perform a literature review of recent applications of AS/SVE technologies - *this is summarized in the work plan;*
- ▶ Determine the optimal operating conditions for AS/SVE in an aeration curtain - *it has been shown that the aeration curtain is successful in significantly reducing TCE concentrations using an air flow of 23 standard cubic feet per minute (scfm) over 50 feet of aeration curtain;*
- ▶ Estimate the rate of TCE removal from groundwater using the AS/SVE system - *a first-order rate of removal appears to*

be occurring; approximately 90 % of the initial concentrations (100 to 800 µg/L) are removed within 48 hours of operation; data obtained after 8 days of operation show concentrations near or below the MCL (Maximum Contaminant Level); a condensed time frame analysis produced a removal rate constant, k , between 10^{-2} and 10^{-3} minutes⁻¹;

- ▶ Estimate the magnitude of the sparging system's zone of influence - *the zone of influence is confined primarily to the aeration curtain itself, thus meeting design expectations;*
- ▶ Identify any limitations of, or interferences with, AS/SVE operations - *undegraded biopolymer slurry material remaining after construction initially interfered with operations; possible siltation interferences prevented collection of samples from one piezometer;*
- ▶ Identify and calibrate an appropriate model that will predict the effects of changes in air flow rate, aeration curtain depth, and local contaminant concentrations - *predicted treatment efficiencies from an equilibrium model have been compared favorably with experimental data; however, further testing should be performed to better assess the model;*
- ▶ Determine the cost and effectiveness of a full-scale system - *a cost analysis is provided in this report; effectiveness should be similar to the technology demonstration;*
- ▶ Determine the applicability of the technology for removal and remedial

actions when discharge of treated groundwater may be a logistical problem - *the technology has proven applicable to the situation at OU 5, where discharge options for the large volume of water generated by a pump and treat system are severely limited;*

- ▶ Supply data to compare AS/SVE cost effectiveness to other alternatives evaluated for groundwater treatment in the OU 5 Feasibility Study - *this objective has been accomplished and is incorporated into the OU 5 Feasibility Study.*

The aeration curtain is cost competitive with pump and treat alternatives and is favored in situations where discharge of treated water is limited; and,

- ▶ Increase technology demonstration resources for use in decision making at Hill AFB - *this has been fulfilled with completion of the performance evaluation report.*