

## EXECUTIVE SUMMARY

The United States Air Force (USAF) will conduct a Dense Nonaqueous Phase Liquid (DNAPL) Source Delineation Project at Operable Unit (OU2), Hill Air Force Base (AFB) in Utah. The focus of this project is to use partitioning interwell tracer tests (PITTs) to determine the volume and extent of DNAPL contamination in the shallow alluvial aquifer. The project is designed to characterize the DNAPL source and select a treatment alternative for OU2. The results of the PITTs will be used in the preparation of a technical comparison of the remedial alternatives (i.e., soil vapor extraction, surfactant-enhanced aquifer remediation, and steam flooding, and the comparison of the costs of these alternatives) for OU2. The resulting information will be used in the technology design to remediate the alluvium in the DNAPL source zone at OU2.

OU2, located on the northeastern boundary of Hill AFB, was used from 1967 to 1975 to dispose of unknown quantities of chlorinated organic solvents from degreasing operations. These DNAPLs, primarily trichloroethene, were placed into at least two unlined disposal trenches underlain by an alluvial aquifer. A large volume of DNAPL remains in the subsurface, predominantly as an immobile or "residual" phase retained as ganglia by capillary forces in the aquifer's pore spaces, and also as a mobile phase pooled in topographic lows in the surface of the clay aquiclude.

The volume and extent of DNAPL contamination at OU2 will be determined by the use of up to five PITTs. This Source Delineation Work Plan (SDWP) divides the project into the following five phases:

- Phase I—Provo Alluvium Characterization Activities
- Phase II—Geosystem Modeling and PITT Well Field Design
- Phase III—PITT Well Field Installation
- Phase IV—PITT Modeling and Design
- Phase V—Water Flood and PITT Implementation
- Phase VI—Treatment Alternatives Analysis.

The PITTs will be conducted in well fields constructed during the course of this project. Prior to the construction of the well fields, it will be necessary to undertake geophysical and cone penetrometer surveys of the site and design the well field on the basis of this newly-acquired information and present knowledge of the site. Once installed, the well fields will be tested to determine the hydraulic properties of the alluvium.

The drilling of each well will provide the opportunity to collect samples of the alluvium that will be used in a series of laboratory experiments to assess the suitability of various candidate partitioning tracers (by column tests) and the potential for DNAPL mobilization during the water floods (by capillary desaturation tests). Furthermore, the samples will be carefully preserved in the field with methanol so that the vertical distribution of the residual DNAPL saturation can be estimated.

The information from the field and laboratory studies will be incorporated into a preliminary geosystem model that integrates stratigraphic, hydraulic, and contaminant data. This preliminary model will be employed to design a water flood and a PITT for each well field. The purpose of the water floods is to mobilize and remove as much free-phase DNAPL as possible via the extraction well arrays in each well field, leaving only residual DNAPL in the aquifer.

Following the cessation of free-phase DNAPL recovery, conservative and partitioning tracers will be added to the water flood to begin each tracer test. The production of the tracers at the extraction well array will yield the tracer response or breakthrough curves which will be analyzed by INTERA to determine the spatial distribution and total volume of DNAPL in the aquifer. This information will then be incorporated into a revised geosystem model of the DNAPL zone which defines the hydrogeological properties and DNAPL distribution in the alluvium.

The OU2 Record of Decision includes provisions for additional source reduction treatment at the site using innovative technologies. The results from the treatability studies will be evaluated using the nine Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 criteria. The volume and extent of DNAPL contamination identified using the results of the PITTs will be used for an alternatives analysis of the candidate innovative DNAPL source remediation technologies.