



ERP Fact Sheet

February 2006

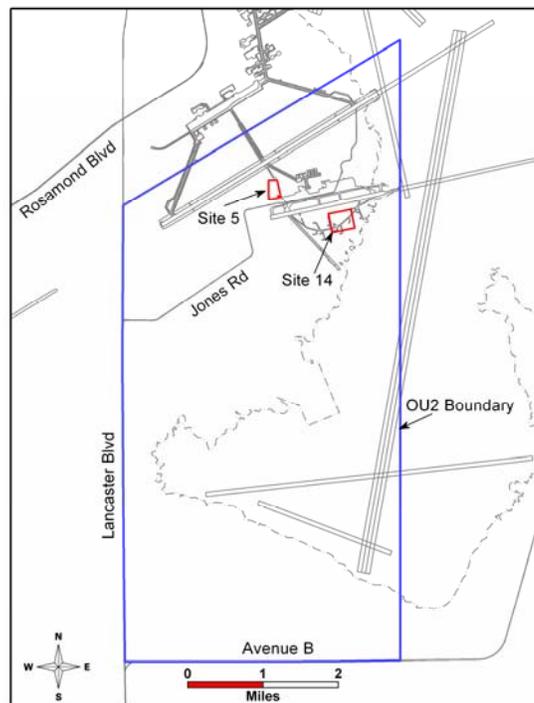
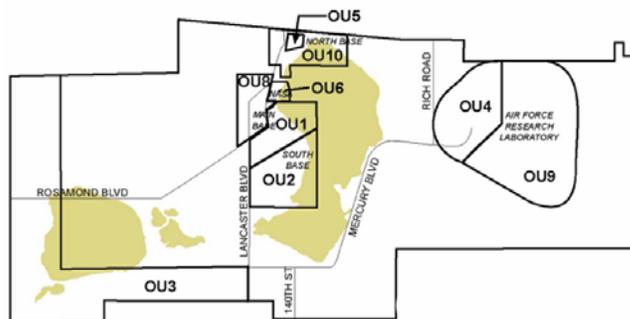
In Situ Treatment a Preferred Cleanup Method for Sites 5/14 Contaminant Plume

This Fact Sheet describes how Edwards AFB proposes to finish its cleanup of Sites 5 and 14, South Base.

Air Force environmental engineers recommend an *in situ* treatment as the preferred remediation method to clean up fuel and solvent contaminated groundwater at the Sites 5/14 Contaminant Plume located in Operable Unit (OU) 2. *In situ* means the groundwater can be treated underground and does not need to be pumped to the surface, treated and injected back into the aquifer. Jet fuel and the solvent trichloroethene (TCE) are the primary contaminants at the site. TCE is used to remove grease from metal parts. Out of the four treatment alternatives proposed by the Air Force, the *in situ* method would remove the contamination in the most timely and cost-effective manner.

Site 5 is the former South Base Waste Petroleum, Oil, and Lubricants Storage Area. The site is located along the western boundary of the Birk Flight Test Facility. Southeast of Site 5 is the old South Base Firefighting Training Facility and surrounding open area collectively known as, Site 14.

Waste fuels and solvents placed in the underground storage tanks at Site 5 leaked into the soil and subsequently reached the



The top map shows the location of OU2 within the boundary of Edwards AFB. The bottom map illustrates the locations of Sites 5 and 14 in OU2

Comments to: Gary Hatch
5 E. Popson Ave., Bldg. 2650A
Edwards AFB Calif., 92324-8060
E-mail: 95 ABW/PAE@edwards.af.mil



This map shows a close-up view of Sites 5 and 14. The colored regions mark the contaminated groundwater and floating free product.

groundwater. A portion of this fuel/solvent mixture (called “free-product”) floats on the surface of the groundwater. The remainder of the fuel/solvent mixture dissolved into the groundwater and was carried southeastward for approximately 5,600 feet to Site 14.

The underground contamination plume extending from Site 5 to Site 14 covers an area of 87 acres. The floating free-product covers an area of 11 acres. The maximum TCE concentration measured in the groundwater at Sites 5 and 14 is 390 parts per billion (ppb). The maximum concentration of TCE in the free product is 220,000 ppb. The regulatory limit is 5 ppb.

The Air Force proposes using two *in situ* methods together to break down the contaminants in the groundwater - aerobic biological degradation and *in situ* chemical oxidation using horizontal wells.

Aerobic biological degradation works by injecting air and nutrients into the groundwater to stimulate the bacteria that eat the contaminants. It works best with fuels. *In situ* chemical oxidation uses an oxidizing chemical to break down contaminants into harmless byproducts. In this case permanganate, a salt, will be used to break down TCE, which is not readily broken down or eaten by bacteria.

Unlike other oxidizing chemicals, permanganate will not react violently with fuels and does not degrade rapidly in groundwater. The permanganate can clean groundwater several hundred feet from where it is injected. As a result, fewer horizontal injection wells would need to be installed to clean the entire Sites 5/14 Contaminant Plume.

Although aerobic biological degradation and *in situ* chemical oxidation using permanganate have been tested at other sites, they have not been tested at Sites 5 and 14. The Air Force would need to conduct small-scale pilot tests to make sure the techniques work before putting in a full-scale system. Land use controls would also be put in place to prevent people from using the groundwater during cleanup.

The OU2 Proposed Plan offers three alternatives to the preferred *in situ* treatment—No Action, Containment, and Source Removal and Containment.

The No Action treatment alternative would not cost anything, but the contamination would remain in place because no monitoring or further cleanup would be performed.

The Containment treatment alternative would cost \$30 million over 100 years to cover the continued operation of a barrier well system already in place at Site 14. The barrier well system is an interim cleanup action that prevents the contamination from moving off site.

The Source Removal and Containment treatment alternative is estimated to cost \$18 million over 30 years to continue the Site 14 barrier well system operation and add a new system to clean up the floating free product at Site 5.

The preferred cleanup method, the *in situ* treatment alternative, would cost an estimated \$7 million over 12 years.