

INFORMATION SHEET

ORDER NO R5-2007-XXXX
UNITED STATES AIR FORCE
BEALE AIR FORCE BASE
ENHANCED IN-SITU BIOREMEDIATION OF
VOLATILE ORGANIC CONSTITUENTS AT SITE 31
YUBA COUNTY

The United States Air Force (hereafter Discharger) owns and operates Beale Air Force Base in Yuba County. Beale Air Force Base is an active Air Force Base approximately 40 miles north of Sacramento and 10 miles east of Marysville. Site 31, the location of an enhanced in-situ bioremediation project that is intended to provide cleanup of groundwater impacted by Volatile Organic Constituents (VOCs). Site 31 is in the south central portion of Beale AFB and includes concrete foundations, which are all that remain of Building 896. Building 896 was the site of a former laundry facility that operated during the 1940's. The site is now surrounded by open grazing land to the west and south, Bulk Storage Area (Site 18) to the east and a contractor staging area to the north. The source areas includes storage tanks (USTs), washracks, an oil water separator and an industrial waste line that have been associated with spills and leaks, which caused groundwater and soil pollution in this area.

Contaminants of concern (COCs) identified in soil and groundwater during the Feasibility Study (FS) include volatile organic compounds (VOCs) and total petroleum hydrocarbons, diesel range (TPH-D). The primary VOC detected in groundwater is trichloroethylene (TCE). The maximum historical concentration of TCE in groundwater beneath Site 31 is 18000 µg/L. Groundwater is encountered at 40 feet below ground surface. Recent groundwater investigations performed to augment the design of the EISB system at Site 31 detected TCE to a depth of 160 feet below ground surface near the source area. The majority of groundwater pollution at Site 31 extends from 40 to 100 feet below ground surface. The EISB project is being conducted as part of a performance based contract between the Discharger and CH2MHill. CH2MHill will construct and operate the EISB system.

The Discharger previously operated an EISB system at Site 10, which is located about 1 mile north of Site 31. In addition to sodium lactate, the EISB system at ERP Site 10 also used KB-1™. KB-1™ is a proprietary non-pathogenic microbial community that is an enrichment derived from naturally occurring bacteria found in soil and groundwater. The addition of KB-1™ provided bioaugmentation of the aquifer and enhanced dechlorination of VOCs. The Site 10 EISB Project demonstrated the cost/benefit of implementing EISB remedial action using sodium lactate and KB-1™.

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The EISB system for Site 31 will include the use of sodium lactate, cheese whey and/or emulsified oil as electron donors, and are intended to be a food source for native microorganisms that are present in the subsurface groundwater. Operation of the system may also include injection of KB-1™ at Site 31. However, KB-1™ will only be used if it is found that the natural bacteria are not capable of providing complete dechlorination of TCE.

The area to be treated by the EISB system is divided into a treatment zone and a transition zone. The treatment zone area includes injection wells that will deliver the amendment sodium lactate, emulsified oil or cheese whey into the subsurface. The transition zone area is downgradient of the treatment zone area and is the area where extremely anaerobic conditions, created by the sodium lactate, emulsified oil or cheese whey, will return to natural aerobic conditions. Injection of sodium lactate in groundwater may have some secondary effects such as increases in total dissolved solids (primarily increases in sodium) and reduced metals (dissolved manganese). Another secondary effect is that the dechlorination of VOCs may not provide complete degradation of TCE and will cause an increase in VOC daughter products. This Order requires the Discharger to demonstrate that metals and other indicator constituents, including VOC daughter products, return to baseline concentrations within the treatment and transition zones.

Any adverse byproducts, such as dissolved metals and VOC daughter products, created by the EISB system, that are outside of the defined treatment zone and transition zone are to be addressed by the Discharger's Contingency Plan. This Order requires the Discharger to implement a Contingency Plan to provide corrective action measures to address any violations of this Order. The Contingency Plan states that the Discharger will operate the EISB System in an active (recirculation) mode and, if necessary, expand the EISB system to address violations of this Order. These Waste Discharge Requirements will be modified, as necessary, to address changes to the EISB system, if the Discharger is required to implement the Contingency Plan.

3/7/2007 RRR