Camp Stanley Storage Activity
Clean-up Activities at SWMU B-3
FACT SHEET

No. 26 – March 2006

Camp Stanley Storage Activity (CSSA) is committed to cleaning up environmental contamination resulting from past post activities. This Fact Sheet provides an overview of planned clean-up activities at solid waste management unit (SWMU) B-3. These clean-up activities are planned to start in April 2006 and will involve removal of waste and contaminated soils. In addition, a remediation system will be installed and tested to determine if it is effective at cleaning up groundwater. Future fact sheets will provide information regarding the results of study and additional clean-up activities.

Background/Mission

CSSA is a U.S. Army restricted access installation located in Bexar County, approximately 19 miles northwest of downtown San Antonio, Texas. Its mission is to receive, store, and issue ordnance materiel as well as quality assurance testing and maintenance of military weapons and ammunition.

SWMU B-3 Background

SWMU B-3 was a landfill area primarily used for office refuse and other garbage disposal. The unit includes trench areas that were reportedly covered circa 1990. SWMU B-3 covers approximately 2.9 acres and is located in the Inner Cantonment area northeast of the main compound (Figure 1). The presence of volatile organic compounds (VOCs), such as tetrachloroethene (PCE) and trichloroethene (TCE), in samples collected from this site in 1995 implicated it as a likely source area for groundwater contamination in the central portion of the post (see Fact Sheet No. 3, October 2001).

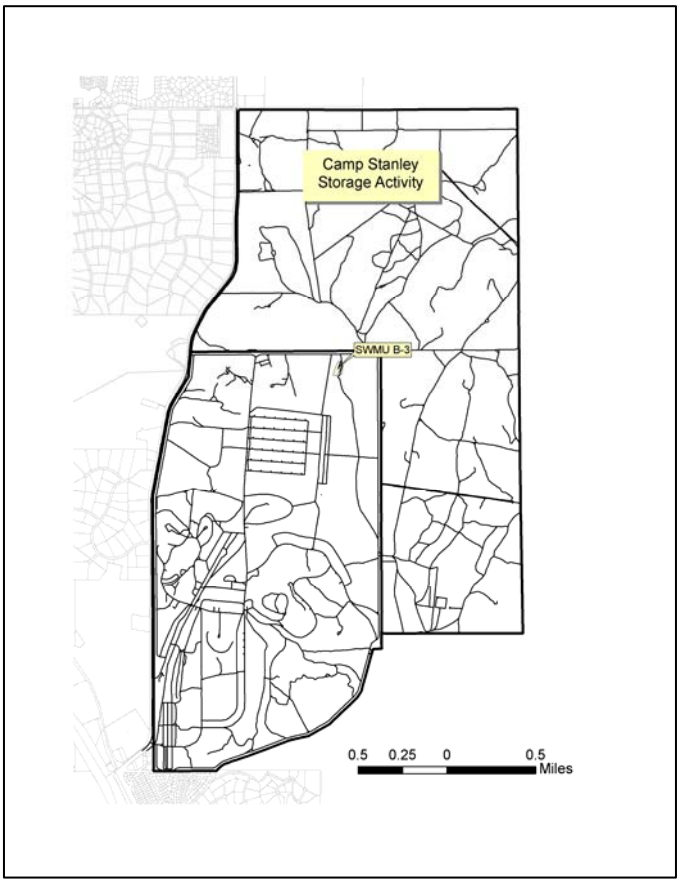
Soils and Waste Clean-up

In late August 2002, CSSA initiated a partial removal action at SWMU B-3. The removal action included excavation and off-post disposal of approximately 7,000 cubic yards of contaminated material from former landfill trenches. CSSA now intends to complete the removal action of the remaining 15,000 cubic yards of non-hazardous waste and contaminated soil material. The non-hazardous waste and contaminated soils are expected to contain low levels of VOCs and lead. Removal actions are expected to start in April of 2006. All waste and contaminated soils removed from SWMU B-3 will be properly disposed of at a permitted landfill. Summary reports documenting the SWMU B-3 removal actions will be prepared after completion.

Groundwater and Limestone Bedrock Clean-up Studies

After all of the waste material and contaminated soils have been removed from SWMU B-3, the only remaining contamination from the site will be in the fractures and crevices of the underlying limestone bedrock and in the groundwater. CSSA has continued to test multiple remedial technologies in order to identify effective ways to address this residual contamination. Clean-up methods being tested at SWMU B-3, including soil vapor extraction and enhanced bioremediation, are described below.

Figure 1



Soil Vapor Extraction

Soil vapor extraction (SVE), also known as "soil venting" or "vacuum extraction", is an in-place or "*in situ*" remedial technology that reduces concentrations of VOCs present in unsaturated soils and bedrock (i.e., dry soils and bedrock above groundwater). In this technology, a vacuum is applied through extraction wells near the source of contamination in the underlying soil. Volatile constituents of the contaminant mass "evaporate" and the vapors are drawn toward the extraction wells and removed.

An SVE system was installed at SWMU B-3 in 1996 and was operated through 2004 as way to clean-up underlying contamination within the limestone bedrock. The initial operations demonstrated that an SVE system at the site could successfully remove VOCs from the subsurface. CSSA estimates that approximately 500 pounds of VOCs were removed during its operation. CSSA plans to restart with SVE

clean-up efforts at SWMU B-3 upon completion of planned groundwater bioremediation studies.

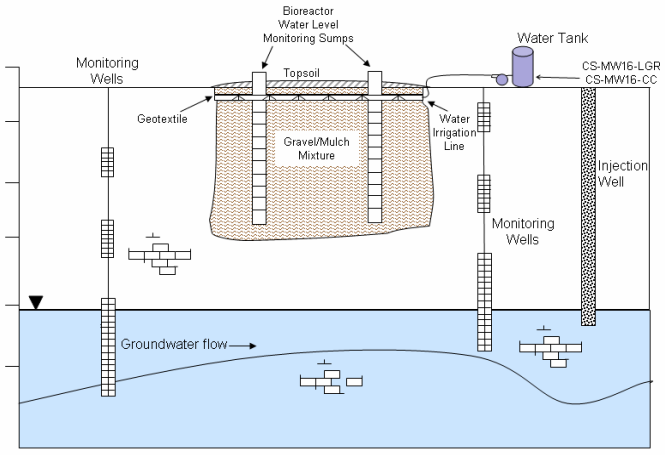
Enhanced Bioremediation

Bioremediation is a natural process in which naturally occurring or inserted micro-organisms (e.g., fungi, bacteria, and other microbes like those in compost) decompose (metabolize) organic contaminants found in soil and/or groundwater, converting them to harmless end-products. Bioremediation can be enhanced by adding nutrients, oxygen, or other ingredients. Bioremediation can be accomplished through aerobic (oxygen rich) conditions or anaerobic (oxygen deficient) conditions. CSSA plans to test the effectiveness of enhanced anaerobic bioremediation (EAB) of the underlying contaminated groundwater and limestone bedrock material at SWMU B-3, as described below.

Groundwater EAB Pilot Study: CSSA plans to start a study of enhanced anaerobic bioremediation at SWMU B-3 this spring. This test will include the injection of harmless organic materials, including vegetable oil and a dairy product, sodium lactate, into the underlying groundwater. The vegetable oil emulsion provides a long-term source of organic carbon in the affected groundwater, and the sodium lactate emulsion provides a more mobile, faster-acting source. CSSA will collect and analyze groundwater samples during the study to determine how effectively enhanced anaerobic bioremediation effectively cleans up VOCs in the groundwater at CSSA.

Limestone Bedrock EAB Bioreactor Study: A pilot study for cleaning up the limestone bedrock beneath SWMU B-3 is planned upon completion of the waste and contaminated soil removal actions. A "bioreactor" will be constructed within the former waste trenches at SWMU B-3 (see Figure 2). After waste and contaminated soil has been removed from former disposal trenches at SWMU B-3, the trenches will be filled back in with a mixture of wood chips and pea gravel. An irrigation system will be constructed on top of the filled-in trenches. As irrigation water saturates the wood chips and gravel layer, the resulting low oxygen water containing dissolved organic carbon should provide for sufficient delivery to the underlying bedrock to accelerate biological activity of microorganisms capable of degrading TCE and PCE anaerobically. Wells installed around the perimeter of SWMU B-3 will be used to closely monitor the effects of the bioreactor.

Figure 2



Continued Clean-up Efforts

CSSA is committed to cleaning up contamination resulting from past post activities. CSSA will continue to operate and evaluate remedial systems, which are designed to remove or remediate VOCs from the underlying bedrock limestone and groundwater. All removal actions and groundwater studies are being done under the regulatory oversight of EPA Region 6 and the Texas Commission on Environmental Quality (TCEQ).

Public Comment

All CSSA Fact Sheets are available from the contacts listed below. CSSA will distribute additional Fact Sheets to inform the public about different aspects of its environmental program. The public is welcome to comment on this Fact Sheet and the environmental activities at CSSA by writing to:

Installation Manager,
Camp Stanley Storage Activity
25800 Ralph Fair Road
Attn: Environmental Office
Boerne, Texas 78015-4800

The public may also comment by calling:

- CSSA Installation Manager, Mr. Jason D. Shirley, at (210) 295-7416;
- EPA Regional Program Manager, Mr. Greg Lyssy, at (214) 665-8317; or
- Fort Sam Houston, Public Affairs Office, Mr. Phillip Reidinger, at (210) 221-1151 or (210) 336-0449 (mobile)

Definition of terms:

Bioreactor	Remediation system which enhances microbial processes to decompose contaminants.
Bioremediation	Natural process in which naturally-occurring or inserted micro-organisms decompose organic contaminants.
CSSA	Camp Stanley Storage Activity
EAB	Enhanced Anaerobic Bioremediation
MCL	Maximum Contaminant Level
PCE	Tetrachloroethene
Plume	A two dimensional area below the surface defined by measurable levels of a groundwater contaminant originating at a given point.
SVE	Soil vapor extraction is a remediation technology that removes subsurface volatile organic compound contamination that is contained in soil gas.
SWMU	Solid Waste Management Unit is a regulatory designation for a known area of waste disposal or contamination of potential environmental concern.
TCE	Trichloroethene
VOC	Volatile organic compound