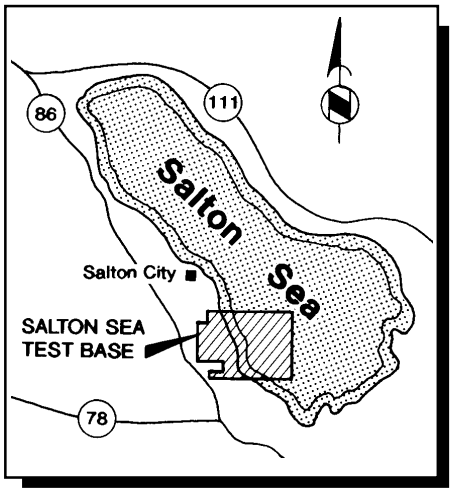
SALTON SEA TEST BASE FACT SHEET

SOUTHWEST DIVISION NAVAL FACILITIES ENGINEERING COMMAND — DEPARTMENT OF THE NAVY

INTRODUCTION

This fact sheet is the sixth in a series designed to inform the local community and interested public of the Navy's plans to formally close and transfer the Salton Sea Test Base (SSTB). Before the property can be transferred to public and/or private entities for reuse, all environmental concerns must be addressed. Previous fact sheets addressed a variety of issues at SSTB, including: the status and progress of the Navy's **Installation Restoration Program**, unexploded ordnance and building demolition, Site Inspection,



underground storage tank investigations, and the Restoration Advisory Board -- a local community advisory group which meets regularly and provides input to the Navy on the cleanup programs at the base (see update inside).

This fact sheet discusses the studies completed in the fall of 1995 to evaluate and implement ***in situ* bioremediation**, a method for cleaning up **petroleum hydrocarbon** (fuel and oil) contamination at SSTB. The two documents produced as a result of these studies, as well as other documents about cleanup activities at SSTB, are available to the public at the information repositories listed on the back page.

Limited Site Investigation Report

Last year, a study called a "limited site investigation" was conducted at SSTB. Field work and technology screening (selection of an appropriate treatment method) were conducted to determine whether *in situ* (in-place) bioremediation would be an appropriate remediation (cleanup) technology for petroleum hydrocarbon contamination found at three locations on the base.

The investigation was limited to three former underground storage tank locations: two tanks were located within the Main Compound Area of the base and the third tank was located at the Remote Camera Site B1, approximately 3 miles northwest of the current base boundary (see map inside). The three tanks were removed in November 1993 and testing of the surrounding soil determined that contamination by petroleum products had occurred.

The special objectives of the limited site investigation and the technology screening were to:

- *evaluate how wide and how deep the petroleum hydrocarbon contamination was at each of the three tank sites;*
- *learn about the geology at each tank site;*

continued...

What is *In Situ* Bioremediation?

Bioremediation is a biological process which uses naturally occurring microscopic organisms in the soil to digest or "eat" contamination caused by organic contaminants; for example, gasoline or oil contamination. For bioremediation to work, the process needs:

- *naturally occurring bacteria*
- *oxygen*
- *a food source (petroleum hydrocarbons)*
- *nutrients (like "fertilizer")*

The end products of bioremediation are carbon dioxide and water. When there are no more petroleum hydrocarbons to eat, the microscopic organisms then die off.

"In situ" is Latin for "in place"; that is, the soil is treated where it is, without having to dig it up and move it elsewhere to treat. Once treatment is complete, as determined through soil testing and sampling, the soil is given a clean bill of health.

Limited Site Investigation Report, continued

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- *characterize the soil and* ***groundwater*** *with respect to in situ bioremediation options;*
- *determine if microscopic organisms (microbes) and nutrients needed for in situ bioremediation were present in the soil;*
- *evaluate three cleanup technologies for feasibility: 1) in situ bioremediation, 2) ex situ (off-site) bioremediation, and 3) excavation of soil and transportation to a licensed landfill; and*
- *perform a cost comparison for each of the three cleanup technologies considered.*

The limited site investigation included taking soil and groundwater samples for laboratory analysis to determine the levels of petroleum hydrocarbons. Wells to monitor and sample groundwater were installed. Finally, the soil and groundwater at each of the three sites were studied for their physical, chemical, and biological characteristics.

Results of the Limited Site Investigation

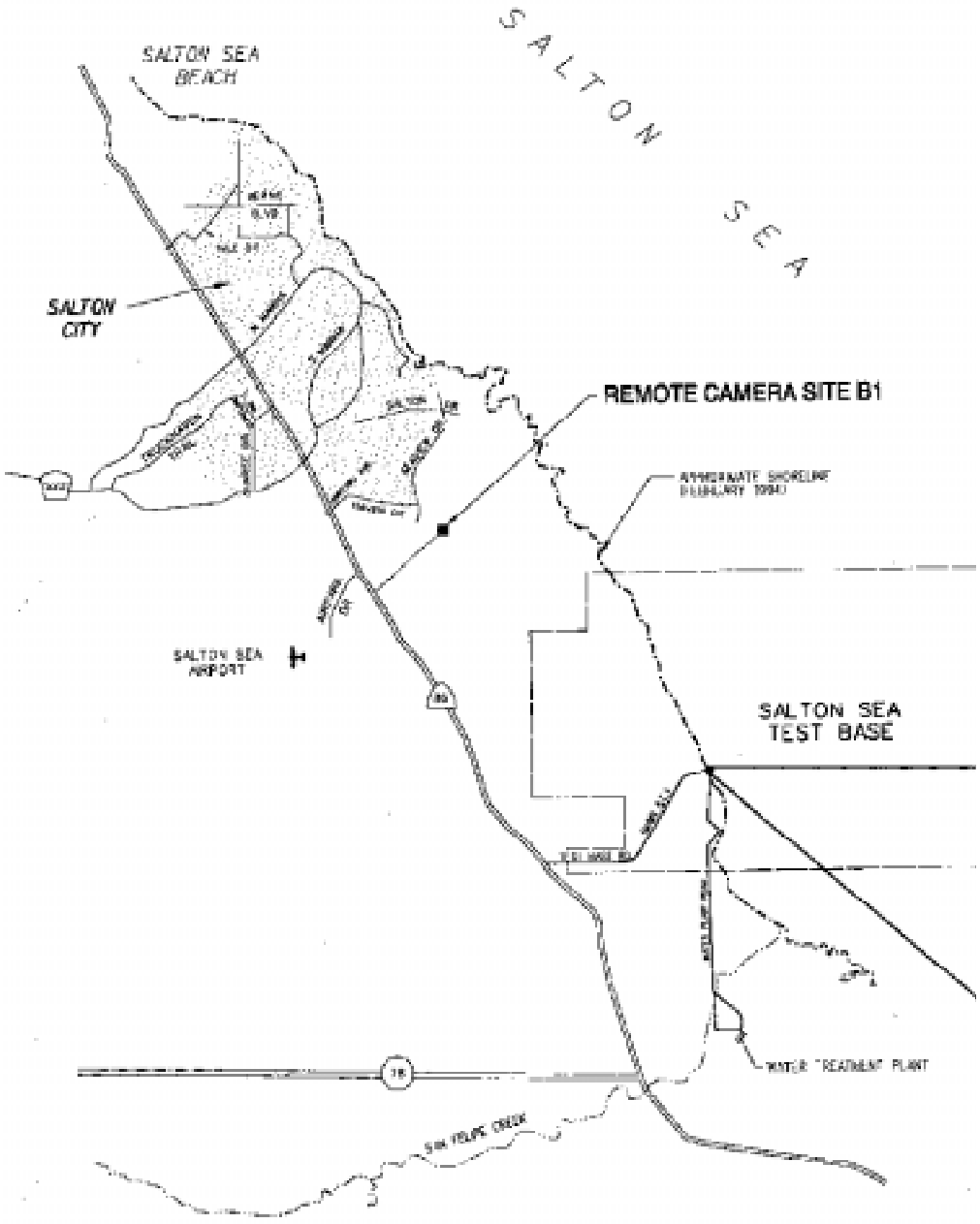
Of the three screening cleanup methods considered, *in situ* bioremediation was determined to be feasible to clean up contaminated soil and groundwater at all three sites. Enough naturally occurring bacteria were found to be present to make the method feasible. However, the lack of significant nutrients (required chemical elements, similar to fertilizer) to make the treatment method work meant that nitrogen and phosphate ("fertilizer") would need to be added to the process at each site.

Of the three cleanup methods considered, the most cost-effective method for the Main Compound Area was *in situ* bioremediation. At the Remote Camera Site the absence of groundwater contamination, the small size of the soil contamination (less than 600 cubic yards), and the dryness of the soils indicated that *in situ* bioremediation would not be cost effective. For that site, excavation of soils and trucking off site to a certified landfill was recommended.

SSTB Windshield Bus Tour Held

On Saturday, February 24, a bus full of West Shores Community folks attended the Navy-sponsored tour of the Salton Sea Test Base. The windshield tour lasted about 2 hours and we visited most of the sites on the base where cleanup has been completed or is currently underway. Mr. Mike Radecki of the Navy, and Mr. Dave Umstot of Bechtel National, Inc., (a Navy contractor) provided lots of information about the sites and answered the public's questions.

A great time was had by all!


SALTON SEA
SALTON SEA BEACH
SALTON CITY
REMOTE CAMERA SITE B1
APPROXIMATE SHORELINE
SALTON SEA AIRPORT
SALTON SEA TEST BASE
WATER TREATMENT PLANT
SAN FELIPE CREEK

Treatability Study Work Plan

A follow-on document, the Treatability Study Work Plan, was finalized in the fall of 1995. The Treatability Study Work Plan presented detailed methods to put in place and evaluate the effectiveness of *in situ* bioremediation under saline (salty) conditions for petroleum hydrocarbon-contaminated soil and groundwater at the two tank sites inside the Main Compound Area. The proposed system consisted of:

- air sparge points (pipes used to deliver oxygen and nutrients underground)
- horizontal vapor extraction wells (these collect off-gases such as carbon dioxide from microbe digestion, and **volatile organic compounds** from the petroleum hydrocarbons)
- nutrient addition system (providing nitrogen and phosphate allows microbes to multiply and digest the hydrocarbons at a faster rate)
- monitoring wells (to track and evaluate the cleanup process)

groundwater - water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel.

***in situ* bioremediation** - an "in place" biological process using naturally occurring microscopic organisms in soil to break down contamination caused by organic contaminants (like gasoline or oil).

Installation Restoration Program - a comprehensive environmental program developed by the Department of Defense and conducted by the Navy to identify, investigate, and clean up hazardous waste sites at all its facilities.

petroleum hydrocarbons - a class of chemicals usually associated with gasoline, oil, or fuel.

volatile organic compounds - organic (carbon-containing) compounds that evaporate (volatilize) readily at room temperature.

The Treatability Study Work Plan recommended an evaluation of the bioremediation technology after six months of system operation, by taking soil and groundwater samples. Since start-up and operation of the treatment system, sampling and monitoring indicate that *in situ* bioremediation is working well and meeting cleanup objectives.

SSTB Restoration Advisory Board Update

The SSTB Restoration Advisory Board is an advisory body made up of community members to provide a focal point for the exchange of information between the Navy and the local community. New members are needed to work with the Navy in its efforts to prepare SSTB property for transfer and reuse. Board members review and provide comments on documents pertaining to environmental cleanup activities.

The Board meets approximately monthly, with a break during the summer months. The next Restoration Advisory Board meeting is scheduled for **7:00 p.m. on April 17, 1996,** at the **West Shores Senior Citizens' Club**. The public is welcome!

Restoration Advisory Board membership applications and information are available by contacting Mr. Mike Radecki, Restoration Advisory Board Navy Co-Chair, at (619) 532-2450 or Ms. Shirley Lee Palmer, Restoration Advisory Board Community Co-Chair, at (619) 394-4333.

Information Repositories for the SSTB cleanup project have been established at two locations in the area so that the local community has the opportunity to review project documents and reports:

Salton City Library
2098 Frontage Road (Hwy 86)
Salton City, CA (619) 394-4446

Hours: Mon-Wed-Fri
8:00 a.m. - noon
1:00 p.m. - 2:00 p.m.

Spencer Library Media Center
Imperial Valley College
Aten Road/Hwy 111
Imperial, CA (619) 355-6377

Hours: Mon - Thurs: 8:00 a.m. - 9:00 p.m.
Fri: 8:00 a.m. - 5:00 p.m.
Sat: 9:00 a.m. - 1:00 p.m.
(except holidays)

In addition, documents, reports, and Restoration Advisory Board meeting minutes and agendas are available at the reading room of the Salton City Spa and RV Park in Salton City. Please contact Ms. Shirley Lee Palmer at (619) 394-4333 for hours.

For More Information

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