

Formerly Used Defense Sites (FUDS) Program



**US Army Corps
of Engineers**

FORMER LAREDO AIR FORCE BASE

Program Introduction

The Department of Defense (DoD) is addressing environmental issues through the Defense Environmental Restoration Program (DERP). The Formerly Used Defense Sites (FUDS) Program is one part of DERP.

FUDS Program Goal

Congress established the FUDS Program in 1984. The Department of the Army is the Executive Agent for the program, while the U.S. Army Corps of Engineers (Corps) is responsible for conducting the cleanups.

FUDS Program Goal

"To reduce, in a timely and cost effective manner, the risk to human health and the environment resulting from past Department of Defense (DoD) activities at formerly used DoD properties."

Properties Addressed by FUDS

The FUDS Program addresses environmental issues at properties formerly owned, leased, or possessed by, or under the jurisdiction of the Secretary of Defense. These properties may be within the 50 states, territories, commonwealths, and possessions over which the U.S. has jurisdiction.

Past property owners include the Army, Navy, Marines, Air Force, and other defense agencies.

Contamination Addressed by FUDS

The FUDS Program only cleans up DoD-generated pollution which occurred before the transfer of property to private owners, or federal, state or local government owners.

Formerly Used Defense Sites (FUDS) Program

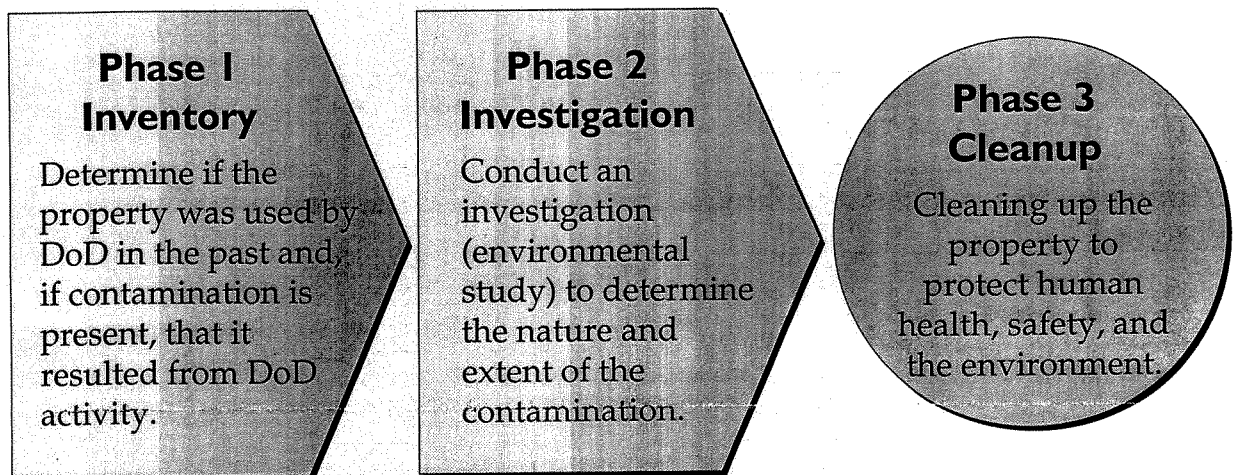
DERP-FUDS Mission

- Identification, investigation, and cleanup of hazardous, toxic, and radioactive waste
- Correction of other environmental damage (e.g. ordnance and explosives)
- Building demolition and debris removal

Potential Stakeholders at a FUDS

Potential stakeholders may include property owners; general public and communities; local, state, and federal regulatory agencies; tribal governments; environmental and public interest groups; and the U.S. Congress.

FUDS Cleanup Process



Formerly Used Defense Sites (FUDS) Program

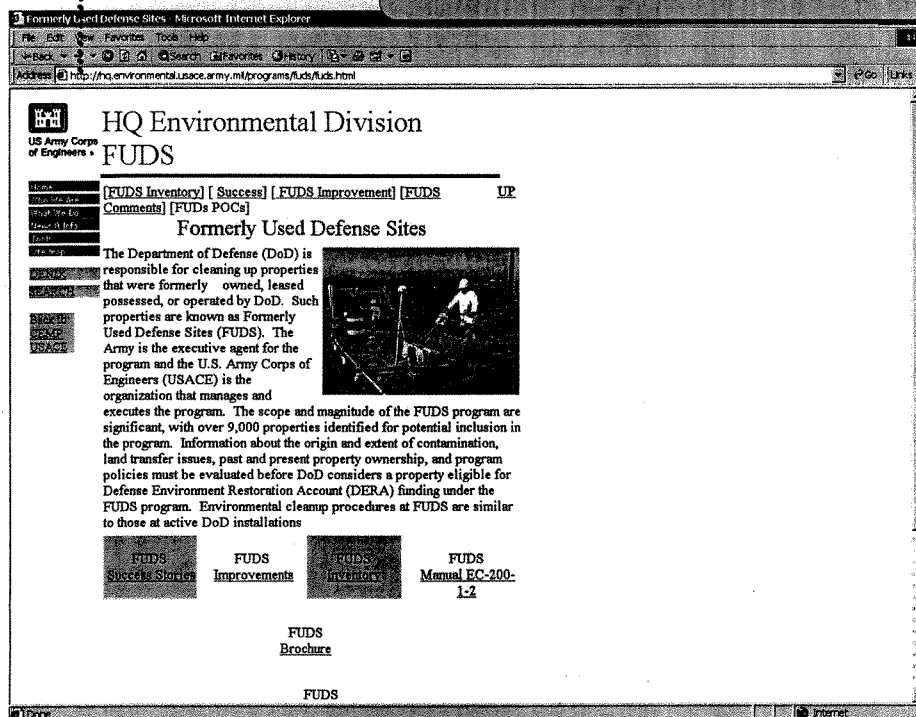
Summary of the FUDS Program

The Corps is responsible for cleaning up DoD contamination at FUDS.

This is a three-phase process: inventory, investigation, and cleanup. The former Laredo Air Force Base is currently in the Investigation phase.

The Internet address for more information about the FUDS program is as follows:

<http://hq.environmental.usace.army.mil/programs/fuds/fuds.html>



Landfills



US Army Corps
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Sanitary Landfill (SLF)

A review of historical aerial photographs indicated that, during the mid-1950s through the mid-1970s, trenches were dug in a configuration similar to that constructed for sanitary landfills (photo below).

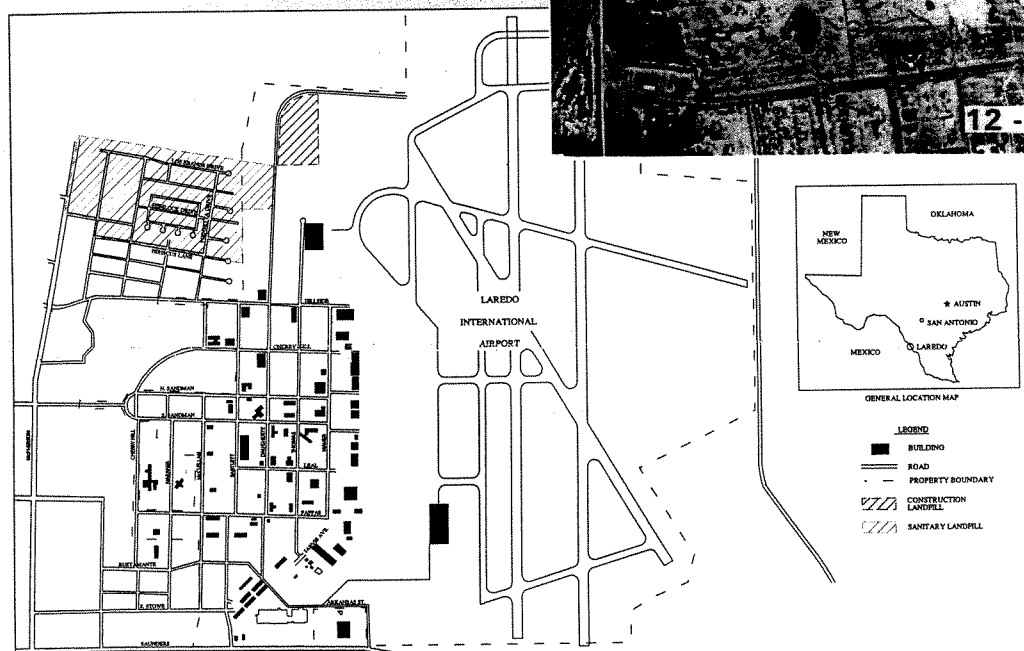
Construction Landfill (CLF)

A review of historical aerial photographs revealed an area of the former base (figure below) where the ground was obviously disturbed and piles of unknown materials were apparent. In aerial photographs after 1970, the area appeared to be covered with dirt and no longer active.

Site Concern

The laws that control what can be placed in a landfill have not always been as strict as today. Therefore, there are no detailed records from the past that describe the type of material buried in the landfills.

Aerial photo of sanitary landfill in 1964.



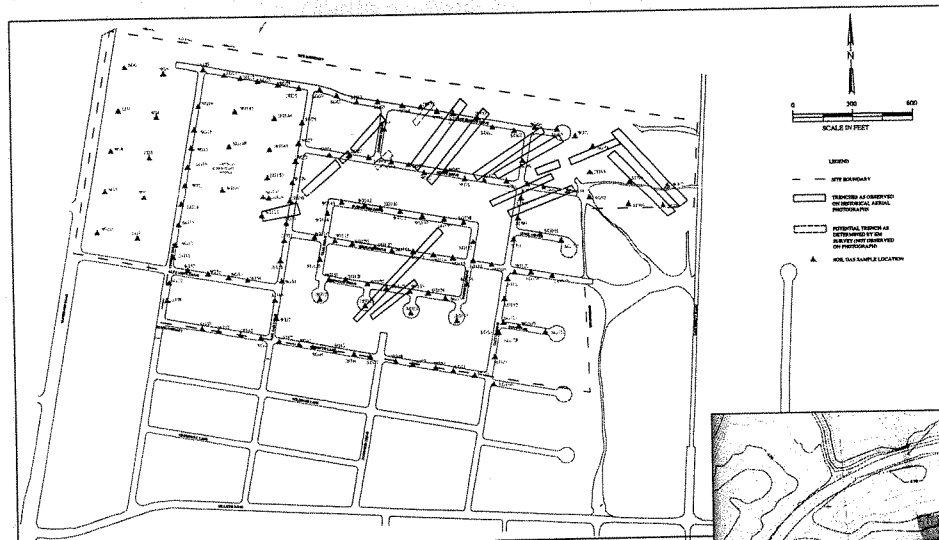
Map showing the locations of the former construction and sanitary landfills.

Landfills - Site Activities

The Corps conducted an electromagnetic (EM) survey and a soil gas survey at both landfill locations.

An *EM survey* detects disturbed ground or buried objects (both of which would occur as a result of landfill activity) without having to dig into the ground.

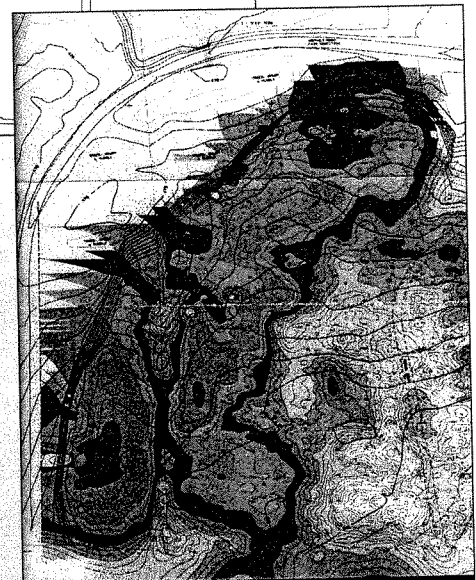
A *soil gas survey* is conducted by pushing into the ground a metal tube which can collect the "air" which exists between the soil grains. The "air" samples can be collected at any depth, from just below ground surface down to groundwater, where there is no longer any air in the spaces between the soil grains. The sample of "air" is then analyzed by a laboratory and the results used to determine if certain chemicals have been released to the soil.



Sanitary Landfill map showing soil gas survey sample locations.

How does an EM Survey work?

An electromagnetic (EM) survey is conducted by sending electric pulses into the ground and measuring the strength of the returning electric pulses after they "bounce" off objects under the land surface. An evaluation of these returning pulses can be used to identify objects underground that are different than the natural soils - in this case, the materials in the landfills.



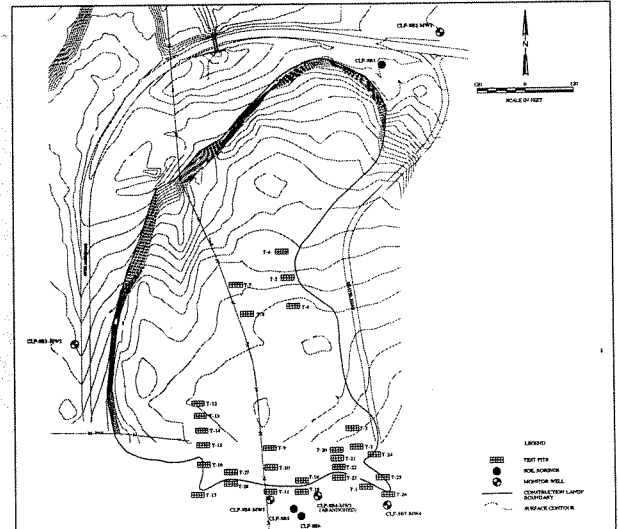
Map produced from the EM survey at the Construction Landfill.

Construction Landfill (CLF)

Site Activities

After the electromagnetic survey and soil gas survey, the Corps conducted the following additional environmental activities:

- Installed five groundwater monitoring wells.
- Collected groundwater samples from the monitoring wells and analyzed them for contamination.
- Excavated 28 pits to identify the type of materials present in the landfill.



Construction Landfill map with soil, groundwater, and test pit sampling locations.

Conclusion

The Corps environmental studies present the following conclusions:

- Established the extent of the CLF based on the review of historical aerial photographs, results from the EM survey, and the observations of the test pits.
- The soil gas and groundwater sample results indicate that there is no contamination at the site that is dangerous to human health or the environment.

Based on the above conclusions, the Corps has determined that no additional environmental investigation is required at the CLF.

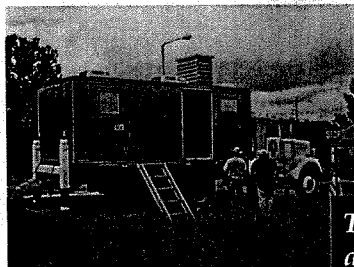
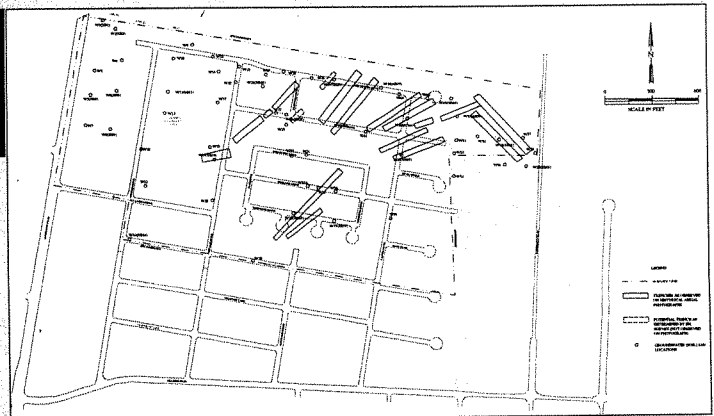
Sanitary Landfill (SLF)

Site Activities

After the electromagnetic survey and soil gas survey, the Corps conducted the following additional environmental activities:

- Collected soil and groundwater samples using the Corps Site Characterization and Analysis Penetrometer System (SCAPS).
- Collected sediment samples from the bottom of a stream located at the north end of the study area and analyzed them for contamination.

Sanitary Landfill map with soil, sediment, and groundwater sampling locations.



The Corps using the SCAPS at the Sanitary Landfill.

Conclusion

The Corps environmental studies present the following conclusions:

- Established the extent of the SLF trenches based on the review of historical aerial photographs and results from the EM survey.
- The soil gas, soil, sediment, and groundwater sample results indicate that there is no contamination in site soil or groundwater that is dangerous to human health or the environment.

Based on the above conclusions, the Corps has determined that no additional environmental investigation is required at the SLF.

SCAPS



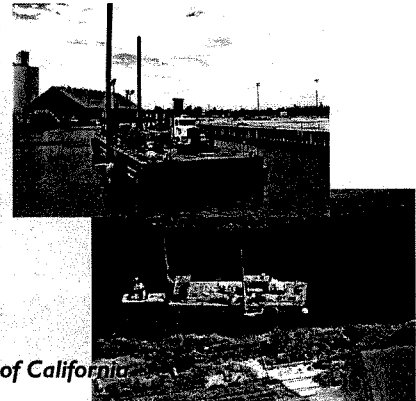
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Tulsa SCAPS Mission Area = Western U.S.

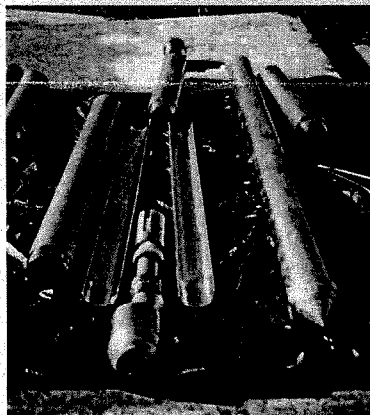


from the streets of Laredo...

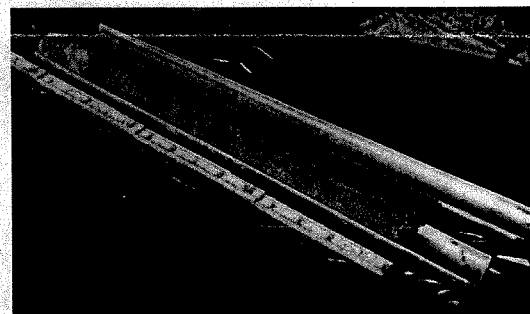


...to the waters of California

Soil Sampling

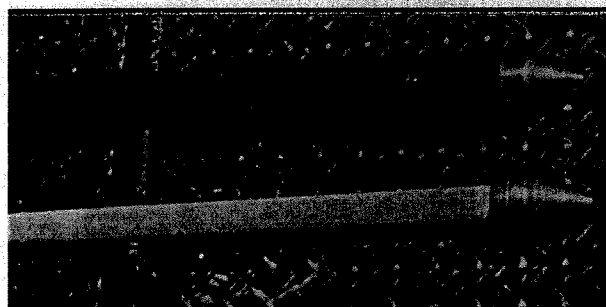


Sampling Tools



Soil Sample

Groundwater Sampling



Slotted PVC Screen

PowerPunch Tip

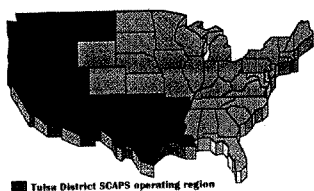
Groundwater Sampling from
PowerPunch Well Point Installation



SCAPS

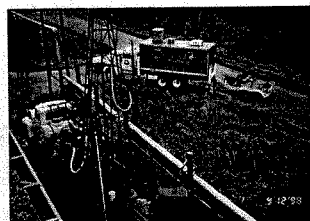
SCAPS

Tulsa District owns and operates one of the three Corps of Engineers Site Characterization and Analytical Penetrometer Systems available for production work. We have operated the SCAPS since 1994, and it has proven itself a significant tool for rapid site assessment, enabling the completion of projects in half the time and half the cost of conventional drilling techniques. In addition to being able to collect environmental samples for laboratory analysis, the SCAPS may be equipped with several probes to facilitate field screening of heavy hydrocarbons, VOCs, metals and high explosives.



Tulsa District SCAPS operating region

Tulsa District operates its SCAPS in states shown in red on the accompanying map. If you have questions regarding whether SCAPS is suitable for your project, please direct them to Ms. Elizabeth Herman at 918-669-7150.



Mobile Analytical Chemistry Lab

Tulsa District complements the SCAPS and other in-house drilling efforts with its mobile analytical chemistry lab. Operated by Tulsa's own chemists, it contains a GC/MS and ITMS and allows investigative efforts to proceed while assessing real-time data. The chemists are also current and knowledgeable in the use of immunoassay, field X-ray fluorescence and other field screening techniques. The use of experienced chemists and geologists in the field contributes to reliable data quality and meeting investigation objectives. Questions regarding the HTRW Design Center's Mobile Analytical Chemistry Laboratory may be directed to Mr. Rex Ostrander at 918-669-4916.

Fire Training Area



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Fire Training Area

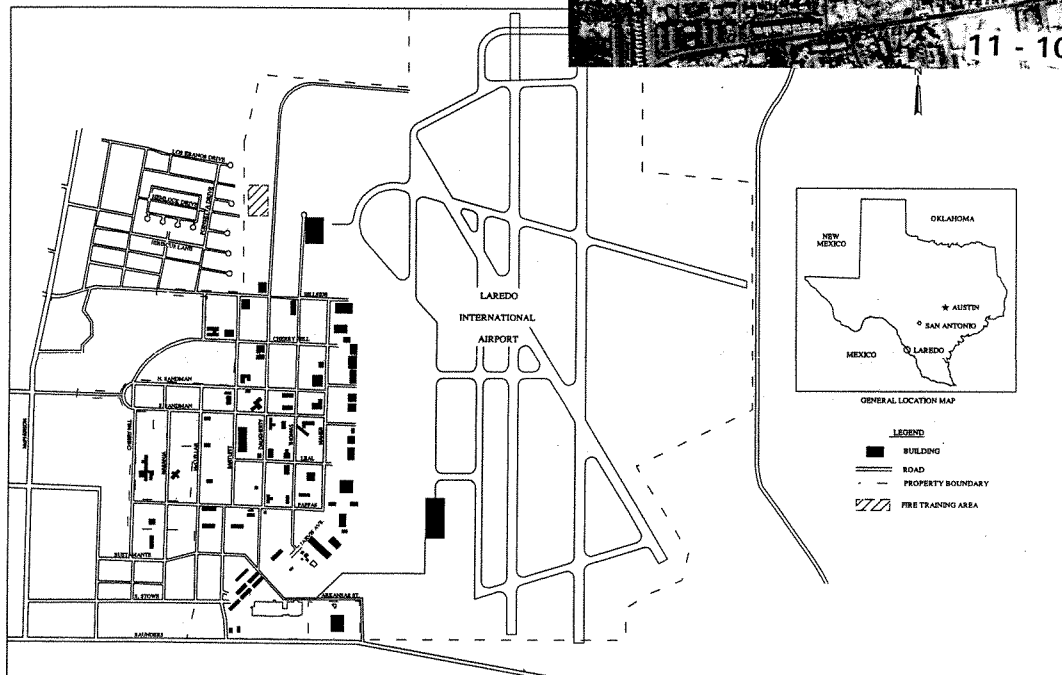
The Air Force used the Fire Training Area (FTA) to train firefighters at the former Laredo AFB until base closure in 1974. The City of Laredo used it from 1975 to 1992 (map below).

The FTA consisted of two burn pits and structures associated with the fire training exercises. The physical condition of the FTA is essentially the same as when its use was terminated in 1992.

Site Concern

During training activities, there may be large volumes of petroleum products (or other flammable liquids) set on fire within the burn area. Any of the liquid that did not burn may soak into the site soils.

*Aerial photograph
of site (1983).*



Map of the location of the former Fire Training Area.

Fire Training Area

Site Activities

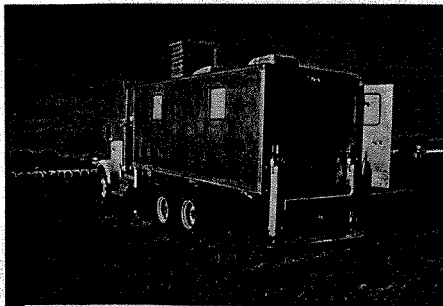
The Corps environmental study at the FTA included the following activities:

Soil Sampling:

- Collection of surface and subsurface soil samples at 30 locations using the Corps Site Characterization and Analysis Penetrometer System (SCAPS) (photograph below).
- Testing soil samples for the presence of petroleum products and metals.

Groundwater Sampling:

- Collection of groundwater samples at 25 locations using the Corps SCAPS. The depth to groundwater was about 20 feet below the ground surface.



The Corps SCAPS in use at the former Fire Training Area (left). The entire site during the Corps investigation (below).



Fire Training Area

Site Results

What was found in the soils?

- Petroleum compounds were detected in soil samples at the study site. At three locations, the concentration of petroleum compounds exceeded the concentration limit set by the State of Texas (Petroleum Storage Tank Division).
- Several metals were detected at concentrations that appear to be representative of naturally occurring conditions, with no apparent connection to the former Fire Training activities.
- Lead was detected at concentrations that exceed limits set by the State of Texas (TNRCC), and the distribution indicates it may be related to the former Fire Training activities.
- Arsenic, cadmium, and chromium were detected at concentrations that exceed limits set by the State of Texas (TNRCC); however, the distribution is representative of naturally occurring conditions, with no apparent connection to the former Fire Training activities.

What was found in the groundwater?

- Petroleum compounds were present in the groundwater at the FTA. The concentrations of several petroleum compounds were greater than the concentrations allowed in groundwater by the State of Texas (TNRCC).
- The testing for metals was only conducted at two locations, so there were not enough data to determine if metals have contaminated the groundwater at the FTA.

Fire Training Area

Conclusion

The Corps environmental studies conducted at the former Fire Training Area present the following conclusions:

- The soil and groundwater are contaminated by petroleum compounds.
- The soil area that is contaminated is a small area.
- Some concentrations of petroleum compounds in the soil are greater than the limits allowed by the State of Texas (TNRCC).
- Some concentrations of petroleum compounds in the groundwater are greater than the limits allowed by the State of Texas (TNRCC).
- The extent of the groundwater contamination has not been determined.

Future Studies

The Corps is working with the City of Laredo and TNRCC to plan additional studies at the former Fire Training Area. The purpose of the studies is to:

- Establish the extent of groundwater contamination.
- Collect additional samples to provide the data required for a complete risk evaluation of the contamination.

Shotgun Range



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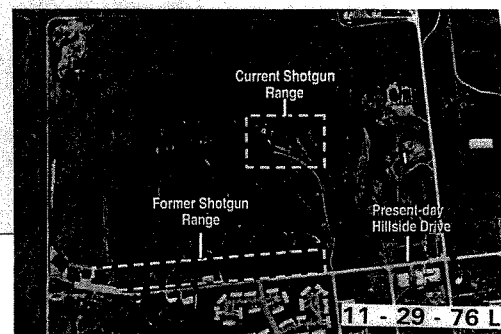
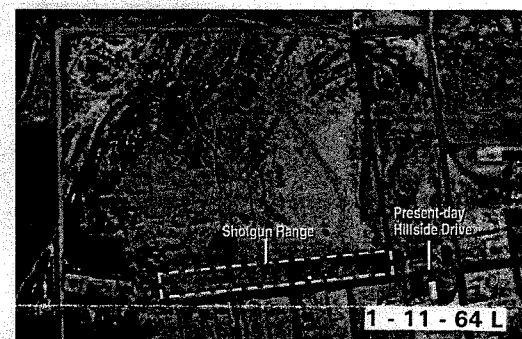
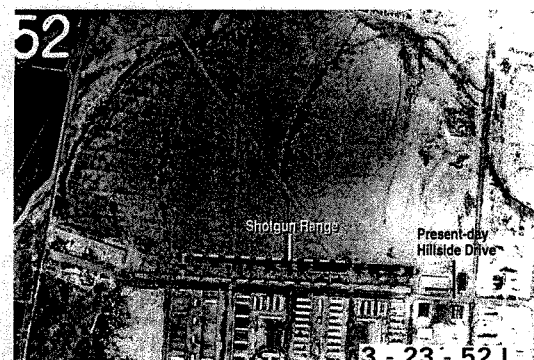
Shotgun Range

A review of historical aerial photographs revealed structures characteristic of a firing range (figure below). The area within the footprint of the firing range activities (structures and firing field) is now residential neighborhoods.

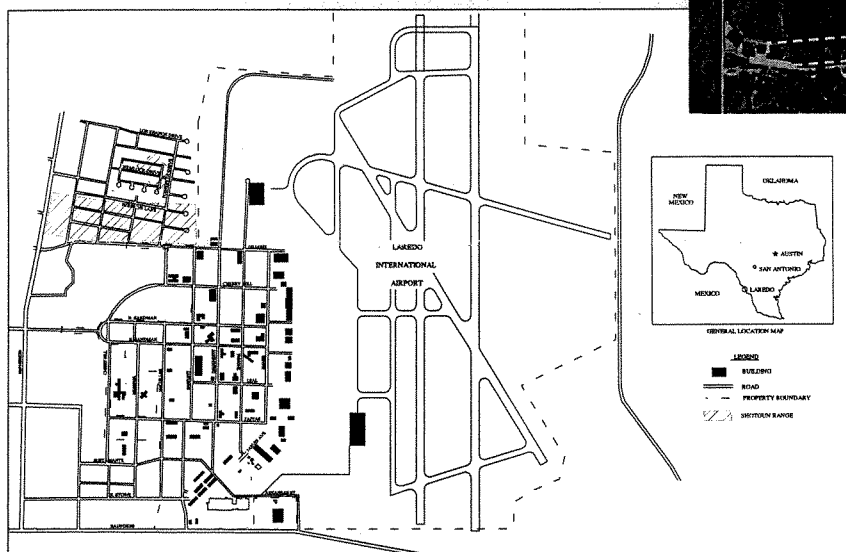
The Air Force used the shotgun range to train troops from 1942 to 1947. The Air Force used the range again during a second phase of the base's history from the mid-1950s until the base closed in the mid-1970s.

Site Concern

Shotgun ammunition typically includes the metal lead. It is possible that some lead still remained in the soil after the demolition of the firing range structures.



Aerial photos
of shotgun range,
from top to bottom,
1952, 1964, and 1976.



Map of the area around the former shotgun range site.

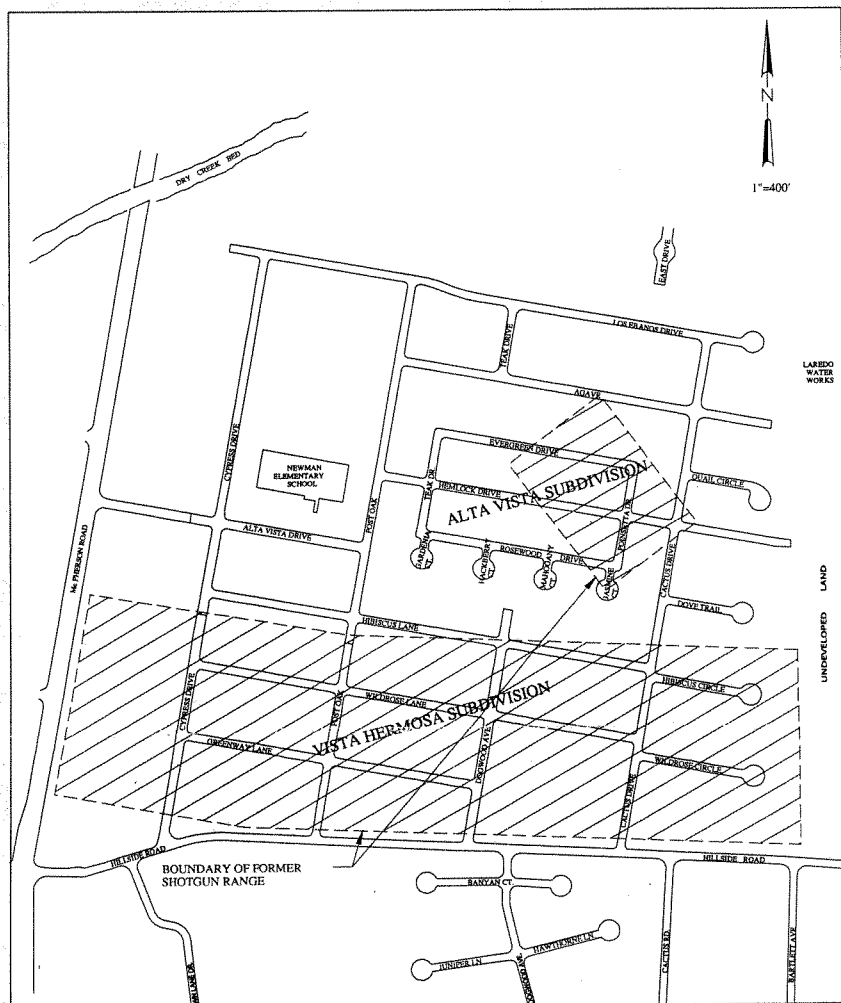
Shotgun Range

Site Activities

Surface and subsurface soil samples were collected at 15 locations and sent to a laboratory for analysis of lead. The surface soil samples were collected from ground surface to 6 inches below ground surface. The subsurface soil samples were collected at approximately 2 feet below ground surface.

What is Lead?

Lead is a metal that is naturally occurring in many soils and some groundwater. Human ingestion of large quantities of lead can result in a number of health issues.



Map of the area around the former shotgun range site.

Shotgun Range

Site Results

At 14 sample locations, the lead concentration detected in soil samples was below the standards set by the State of Texas (TNRCC) for protection of human health.

Lead was detected in the 14 soil samples at a concentration higher than the concentration permitted by TNRCC for protection of groundwater. However, groundwater is not used in this area, and the City of Laredo supplies water to all local homes.

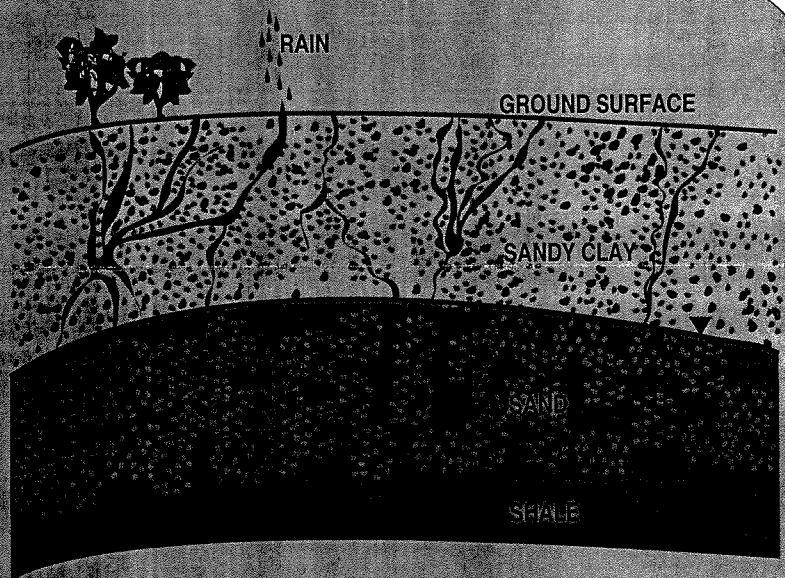
At one sample location, lead was detected at a concentration higher than TNRCC allows. Three additional samples were collected at this location, and the lead concentrations did not exceed TNRCC limits.

Who is TNRCC?

TNRCC stands for the Texas Natural Resource Conservation Commission. Among other responsibilities, this government commission determines what concentrations of chemicals in soil and groundwater are safe for human health and the environment. For studies at the shotgun range, the soil sample results are compared to "screening levels" set by TNRCC.

What is Groundwater?

Groundwater is water that is stored in the tiny open spaces between rock, sand, soil, and gravel under the land's surface. Groundwater is found just below the land surface along with air in the open spaces. At deeper levels, all the open spaces are filled only with water.



Shotgun Range

Conclusion

The results of the study conducted at the former shotgun range concluded that there has not been a significant impact to the soils from site activities.

Future Studies

The Corps is working with TNRCC in planning additional studies at the site to collect soil samples at more neighborhood locations and to sample groundwater.

Industrial Waste Treatment Plant & Fuel Farm



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Industrial Waste Treatment Plant

The Industrial Waste Treatment Plant (IWTP) was identified during a review of historical base documents.

The Air Force constructed the IWTP in 1969 to treat water flowing from the following sources:

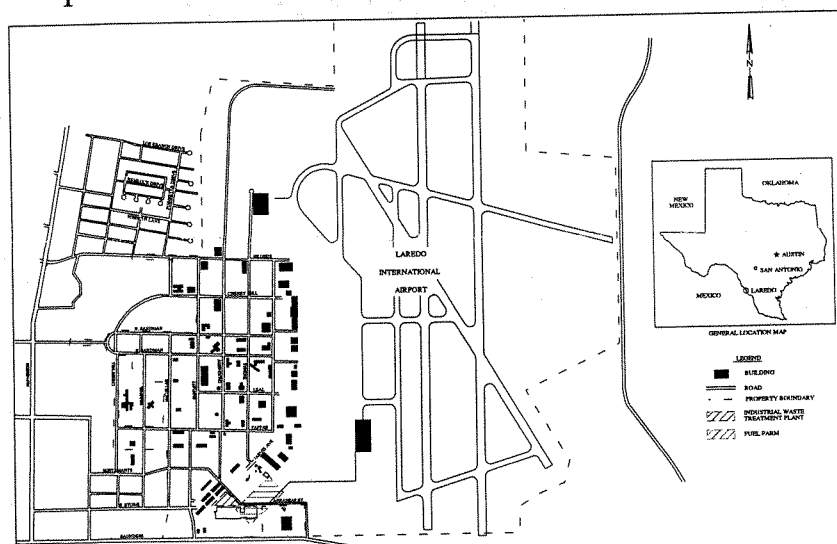
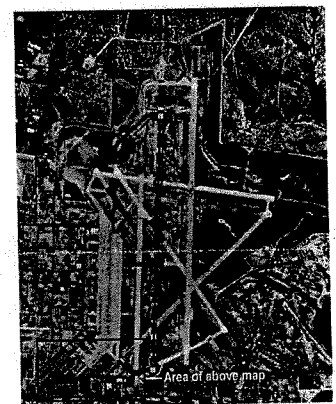
- the base-wide storm sewer system
- run-off from the flightline
- the bermed area of the base fuel farm

The IWTP treated the water and released it into the base sanitary sewer system, which in turn was connected to the City of Laredo sanitary sewer system. The IWTP was taken out of service in 1974 when the base closed.

The former IWTP is located within the boundaries of the Laredo International Airport.

Site Concern

Daily activities during the operation of the IWTP and Fuel Farm may have resulted in spills or leaks from site equipment. These potential spills could impact the soil and groundwater with petroleum or other compounds.



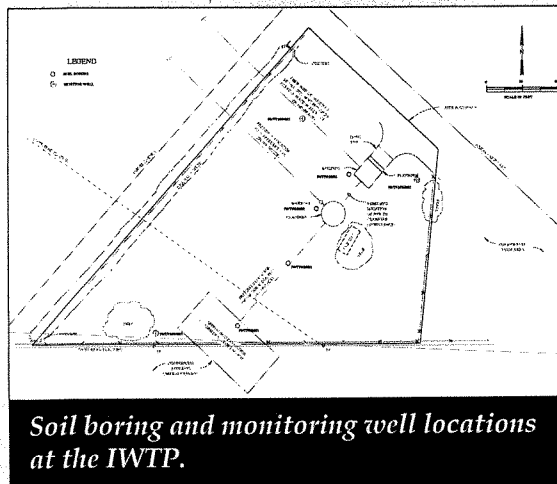
Map showing the locations of the former IWTP and Fuel Farm.

Industrial Waste Treatment Plant

Site Activities

The Corps environmental study at the former IWTP included the following activities:

- Drilling seven soil borings.
- Collecting three soil samples from each soil boring.
- Installing three groundwater monitoring wells.
- Collecting groundwater samples from each monitoring well.



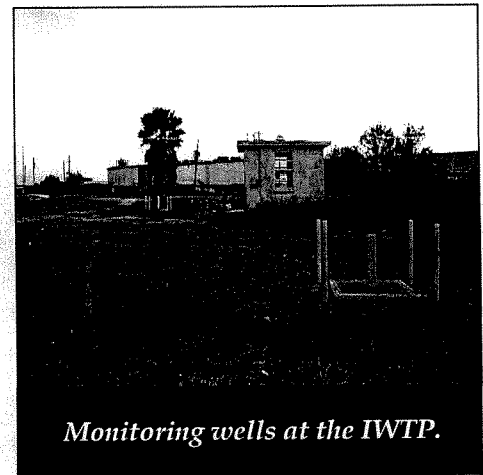
Conclusion

The Corps environmental studies at the IWTP present the following conclusions:

- Petroleum-related products are present in the soil and groundwater; some petroleum products were detected at concentrations greater than that allowed by the State of Texas (TNRCC).
- The location of the petroleum products indicates that the contamination is not the result of the former IWTP operations.

Future Studies

Additional studies may be required at the IWTP to determine the extent and the source of the petroleum compounds. These studies may include soil and groundwater sampling in the vicinity of the former IWTP.

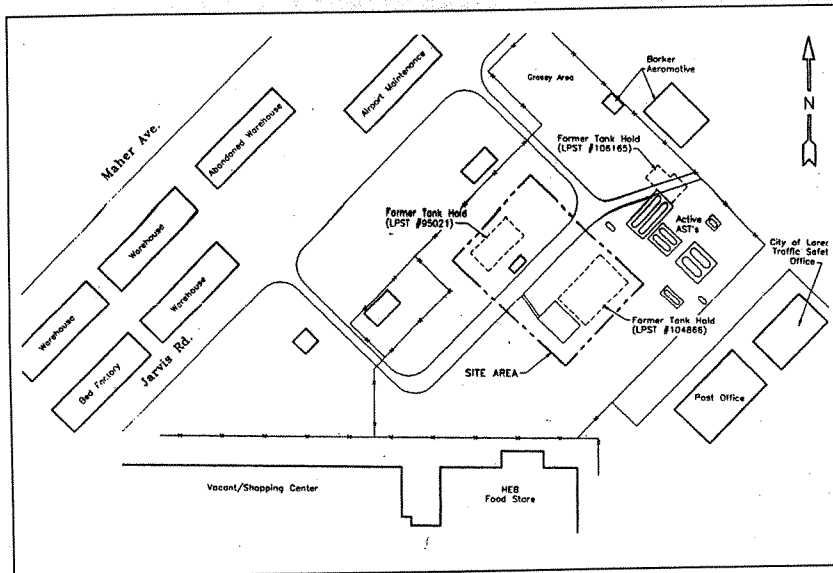


Fuel Farm

Fuel Farm

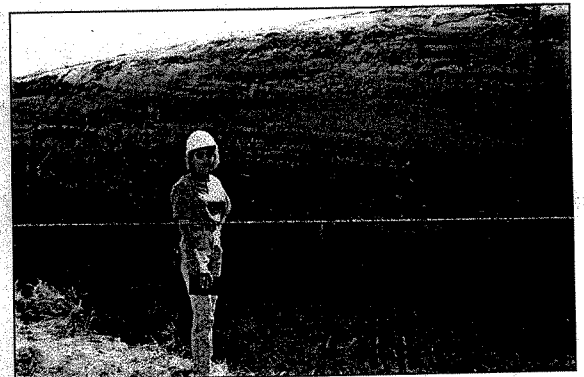
The Fuel Farm is where aviation fuel was previously, and is currently, stored and dispensed from aboveground and underground storage tanks. Sixteen underground storage tanks were removed from the Fuel Farm site in 1993. Six additional tanks were removed from the site in 1997.

The Fuel Farm is located within the boundaries of the Laredo International Airport.



Fuel Farm Site Map

*Underground Storage Tank
Removals at the Fuel Farm.*



Fuel Farm

Site Activities

Environmental studies at the Fuel Farm included the following activities:

- Soil vapor sampling.
- Installing groundwater monitoring wells.
- Collecting and analyzing groundwater samples since 1990.
- Installing extraction wells to remove petroleum products in the groundwater.
- Removing 16 underground storage tanks in 1993.
- Removing 6 underground storage tanks in 1997.

The Corps removed the underground storage tanks; the City of Laredo conducted all the other activities.

Conclusion

The Corps and City of Laredo environmental studies present the following conclusions:

- The soil and groundwater in the vicinity of the Fuel Farm have been contaminated with petroleum products.
- The extent of the petroleum contamination in groundwater has not been determined.

Future Studies

The Corps and the City of Laredo are negotiating an agreement to share the cost of addressing the environmental issues at the Fuel Farm.