

**PURPOSE OF DOCUMENT**

- A. These *Decision Documents* present a summary of background, risks, the selected remedy, and community participation for 15 Installation Restoration Program (IRP) sites at Holloman Air Force Base (AFB). The remedies were selected on the basis of investigations and risk assessments conducted for each site. This document was prepared for, and in cooperation with, the Base Environmental Office: 49 CES/CEV, 550 Tabosa Avenue, Holloman, AFB, New Mexico, 505/475-5395.
- B. The decision documents are required as part of the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA).
- C. These decision documents provide the rationale for the selected no action remedy at 11 IRP sites and remedial action at 4 IRP sites.



## INTRODUCTION TO DECISION DOCUMENTS

Holloman AFB under the guidance of the U.S. Environmental Protection Agency Region VI (U.S. EPA Region VI) and the New Mexico Environment Department (NMED) presents these *Decision Documents* as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA). These *Decision Documents* summarize information and data found in the following reports:

- The *Remedial Investigation (RI) Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992);
- The draft final *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992);
- The draft final *Corrective Measures Study (CMS) Plan—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1993);
- The draft final *Preliminary Assessment and Site Investigation Report—Investigation of Four Waste Sites* (HAFB, 1993);
- The draft final *Feasibility Study—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1993);
- The draft final *Phase I RCRA Facility Investigation Report—Table 2 Solid Waste Management Units* (HAFB, 1994); and
- The draft final *Phase II RCRA Facility Investigation Report—Table 1 Solid Waste Management Units* (HAFB, 1995)

These reports have been placed in the Administrative Record, is available at the following locations:

Base Library  
955 First Street  
Holloman AFB, NM 888310-8037

Alamogordo Public Library  
920 Oregon  
Alamogordo, NM 88310

In 1983, Holloman AFB entered into the Air Force's IRP by conducting the IRP Phase I Records Search (HAFB, 1993). The IRP is a phased investigation and remediation program that follows the protocols

of CERCLA and the statutory amendments (SARA) to CERCLA requiring that federal facilities comply with the National Contingency Plan. Since 1987, Holloman AFB has been actively implementing their IRP through investigations (RIs), feasibility studies (FSs), and remedial actions.

In 1991, U.S. EPA Region VI issued Holloman AFB the Hazardous and Solid Waste Amendments (HSWA) portion of their Resource Conservation and Recovery Act (RCRA) permit (Permit No. NM 657212442). The permit required Holloman AFB to investigate approximately 240 solid waste management units (SWMUs) and areas of concern (AOCs).

Many of the IRP sites included in this document are also RCRA SWMUs or AOCs. Table 1-1 presents the IRP sites and corresponding RCRA site number, and Figure 1-1 shows the location of the sites on Holloman AFB, and Figure 2-1 shows the surface drainages. Since its HSWA permit was issued, Holloman AFB has integrated the two regulatory programs to reduce duplicative efforts. This approach has been embraced by the U.S. EPA Region VI and the New Mexico Environmental Department (NMED). Because the two programs did not begin concurrently, the terminology used to describe the site activities depends on the time of the investigation and how the program was funded by the Department of Defense. All investigations and studies conducted for the sites in this document have met the requirements of the IRP and RCRA program. Following are some of the issues that may cause some confusion between the two programs:

- Similar phases of the RCRA corrective action program and IRP have unique names and have both been used (i.e., RI vs. RFI).
- IRP sites and RCRA SWMUs have unique names and unique numerical or alphanumerical identifications. Both are provided initially in this report, but the IRP name and identification will be used subsequently.
- Some IRP sites consist of multiple SWMUs, some of which are on different Tables in the HSWA permit. Holloman AFB made efforts to rectify this through Class I permit modifications, but some SWMUs still remain on separate Tables although they constitute only one IRP site.

Efforts are made in these decision documents to clarify the history and terminology. All references in these documents are cited using the IRP terminology.

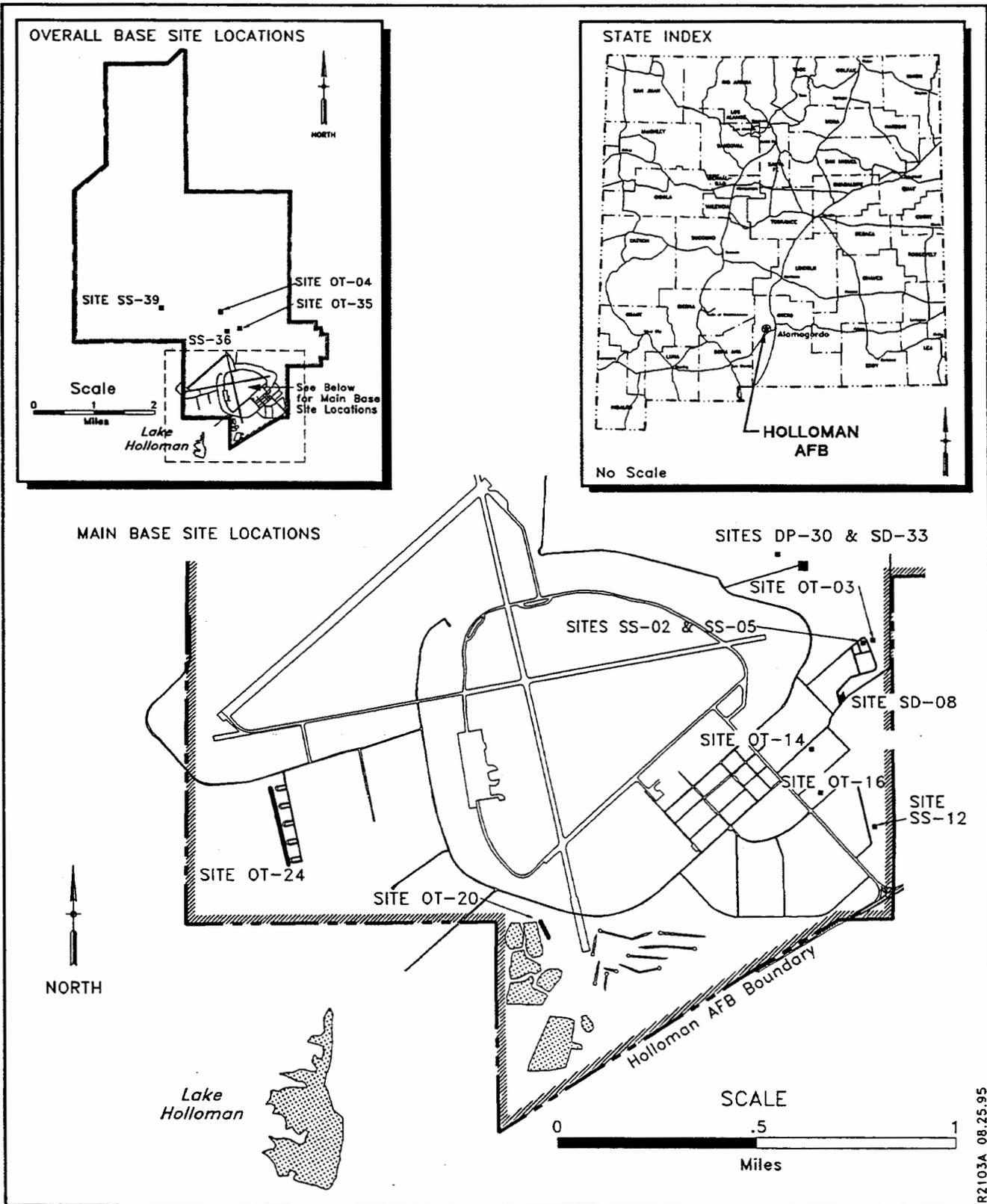


Figure 1-1. Location of 15 IRP Sites at Holloman AFB

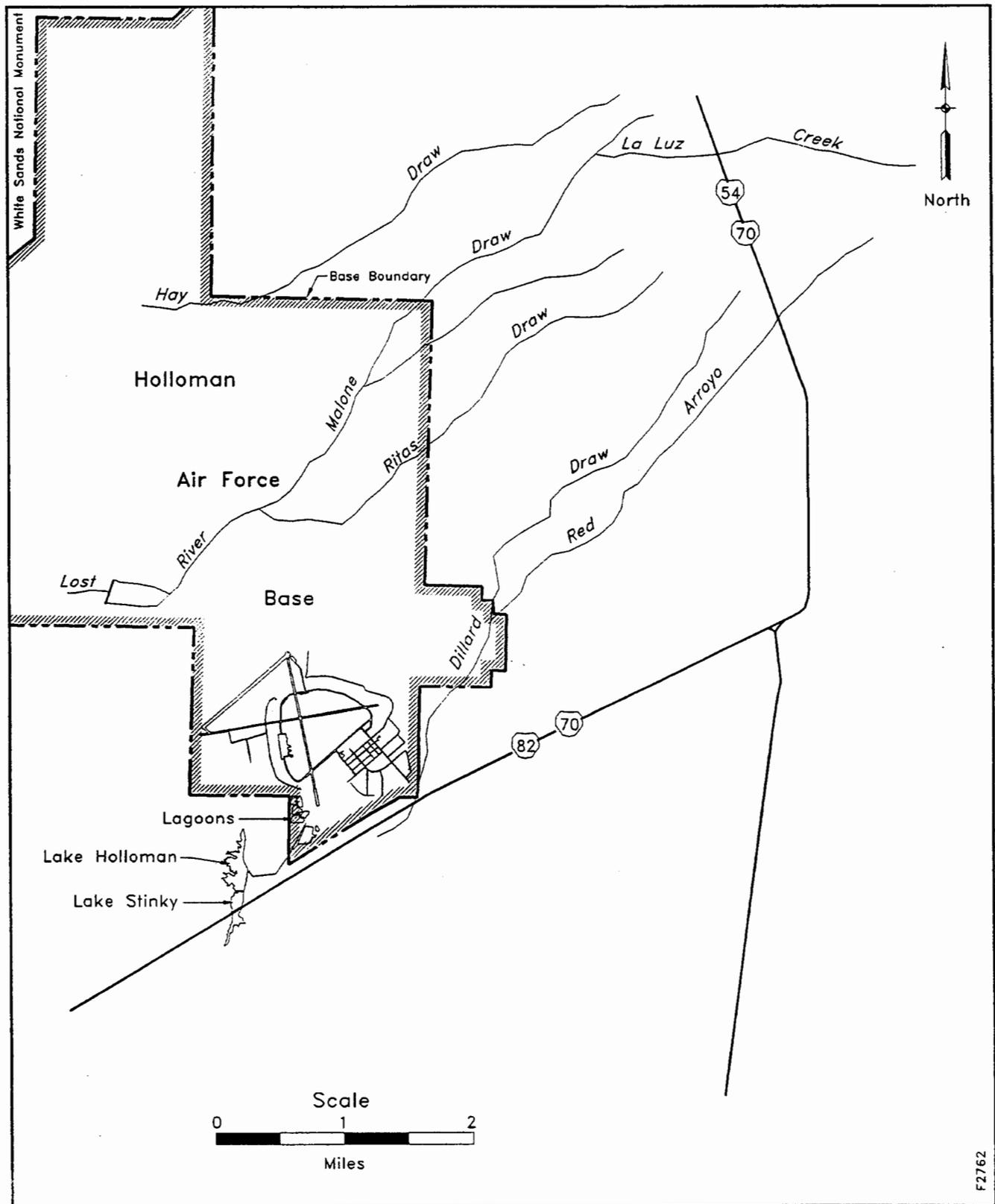


Figure 1-2. Surface Drainages at Holloman AFB

For the site investigations, evaluation of the data to determine the selected alternative involved completion of a quantitative risk assessments, and a comparison of results to health-based action levels and Base-wide background concentrations for naturally occurring constituents (e.g., inorganics). Risk assessments were conducted using the guidelines provided in the *Risk Assessment Guidance for Superfund* (U.S. EPA, 1989). The background levels were established during two separate studies at Holloman AFB: the Phase I RI Report (HAFB, 1992) and the *Base-wide Background Study* (HAFB, 1993). Cleanup of TRPH-contaminated soils is guided by an agreement between Holloman AFB and the NMED.

As part of the selected remedy, all construction activities at IRP sites must be coordinated and approved by Holloman AFB Environmental Flight prior to initiation. As a branch of the Federal government, Holloman AFB must comply with the procedures outlined in the National Environmental Protection Act (NEPA). Proposed projects at Holloman AFB must go through the Environmental Impact Analysis Process (EIAP), which includes a review of former or closed IRP sites that may impact the project.

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**GLOSSARY**

The Decision Documents for Sites SS-02, SS-05, OT-03, OT-04, SD-08, SS-12, OT-14, OT-16, OT-20, OT-24, DP-30, SD-33, OT-35, SS-36, and SS-39 use similar terms and acronyms. To eliminate redundancy in the reference to these shared terms and acronyms, the glossary shown below gives a complete list of the acronyms used in the document.

- AFB—Air Force Base
- ARARs—Applicable or Relevant and Appropriate Requirements
- bgl—Below ground level
- BTEX—Benzene, Toluene, Ethylbenzene, and Xylenes
- CERCLA—Comprehensive Environmental Response, Compensation and Liability Act
- HDPE—High-density Polyethylene
- GAC—Granular Activated Carbon
- IRP—Installation Restoration Program
- NMED—New Mexico Environment Department
- NM WQCC—New Mexico Water Quality Control Commission
- O&M—Operation & Maintenance
- PCBs—Polychlorinated Biphenyls
- POL—Petroleum, Oil, and Lubricant
- RCRA—Resource Conservation and Recovery Act
- RFI—RCRA Facility Investigation
- SVE—Soil Vapor Extraction
- SVOCs—Semivolatile Organic Compounds
- SWMU—Solid Waste Management Unit
- TPH—Total Petroleum Hydrocarbons
- TRPH—Total Recoverable Petroleum Hydrocarbons
- RI—Remedial Investigation
- U.S. EPA—U.S. Environmental Protection Agency
- VOCs—Volatile Organic Compounds

**Declaration**

**Statutory Preference for Treatment as a  
Principal Element is Applicable  
and a Five-Year Review is not Required**

**Site Name and Location**

IRP Sites SS-02 & SS-05 (RCRA Site AOC-T)  
Spill Site No. 1 and Spill Site No. 2  
Holloman Air Force Base, New Mexico

**Statement of Basis and Purpose**

This decision document presents the selected remedial action for the referenced site chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the selected remedy.

**Assessment of the Site**

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this decision document, may present a current or potential threat to public health, welfare, or the environment. However, no unacceptable risk to human health or the environment is present at this time.

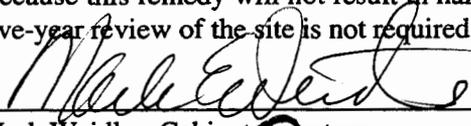
**Description of the Selected Remedy**

The selected remedy will reduce the concentration of petroleum hydrocarbons in the soil to the NMED-cleanup level for Holloman AFB. The remediation of petroleum hydrocarbons in the soil will limit further degradation of groundwater beneath the site. The major component of the selected remedy is the installation of a soil vapor extraction system. In addition to the selected remedy, a long-term groundwater monitoring program will be conducted at the site to ensure the effectiveness of the remedy.

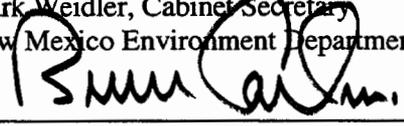
**Declaration Statement**

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical and satisfies the statutory preferences for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will not result in hazardous substances remaining on site above health-based levels, a five-year review of the site is not required

  
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Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

9/29/95  
\_\_\_\_\_  
Date

  
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Bruce Carlson  
Brigadier General, USAF Commander

3 Nov 95  
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Date

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## Decision Summary

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### Site Name, Location and Description

IRP Sites SS-02 & SS-05 occupy approximately one-third acre in the northeastern portion of the POL storage yard, which is located east of the Main Base and approximately 900 ft west of the Base boundary. Because of the sites' proximity to each other, investigations for the sites were combined. The sites are located in the vicinity of 14 former 25,000-gal. aboveground storage tanks. A mound of soil now exists in the area of the former tanks. Ground surface at the site is void of vegetation. The general topography of the site is gently sloping from the northeast to southwest, but immediately east of the site the land surface dips rather steeply into a surface drainage feature. The drainage feature, Dillard Draw, is located adjacent to the eastern boundary of the Base. Figure 1-1 shows the location of the sites at Holloman AFB, and maps the layout of the sites.

Soils at the sites consist primarily of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. The regional groundwater flow direction is controlled by southwest-trending arroyos and is to the southwest, following the Dillard Draw surface drainage system (see Figure 1-2). At the sites, groundwater occurs approximately 15 ft bgl and flows to the east, toward Dillard Draw.

The unconfined aquifer beneath the sites, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

The POL storage yard contained 14 25,000-gal. aboveground storage tanks in an unlined bermed area. Spills of JP-4 and Avgas occurred throughout the bermed area between the early 1960s and the late 1970s when the fuel tanks were periodically overfilled. According to Base personnel, approximately 30,000 gal. of JP-4 fuel was spilled in 1978 when a drain valve was accidentally left open. Approximately 95% of the fuel was recovered, but an estimated 1500 gal. seeped into the gravel base of the POL storage area. The tanks were removed in 1987, but the tank saddles were left in place and covered with soil.

Sites SS-02 & SS-05 were identified as a potential contaminant sources during an IRP records search conducted in 1983. As a result, the sites were included in a Phase I RI completed in 1992. Results of the Phase I RI indicated that petroleum contamination was present in the soil and groundwater beneath the site. Because TRPH concentrations in the soil exceeded the Base-specific cleanup level, the sites were recommended for remedial action. After reviewing the Phase I RI report, the U.S. EPA Region VI concurred with site remediation and requested an additional investigation to further delineate the source and lateral extent of the soil contamination and to delineate the extent of groundwater contamination.

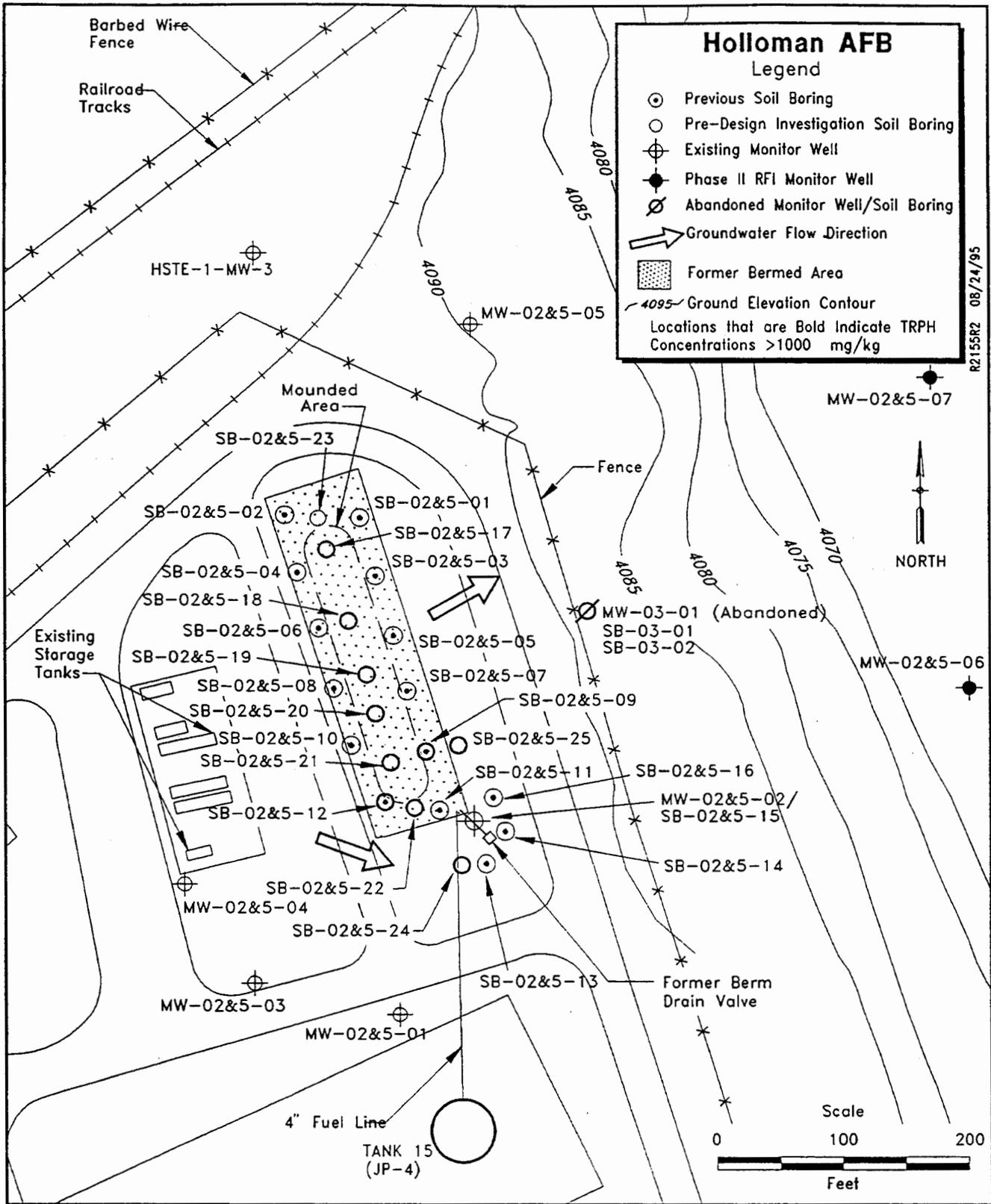


Figure 2-1. Map of Soil Sample Locations at IRP Sites SS-02 & SS-05

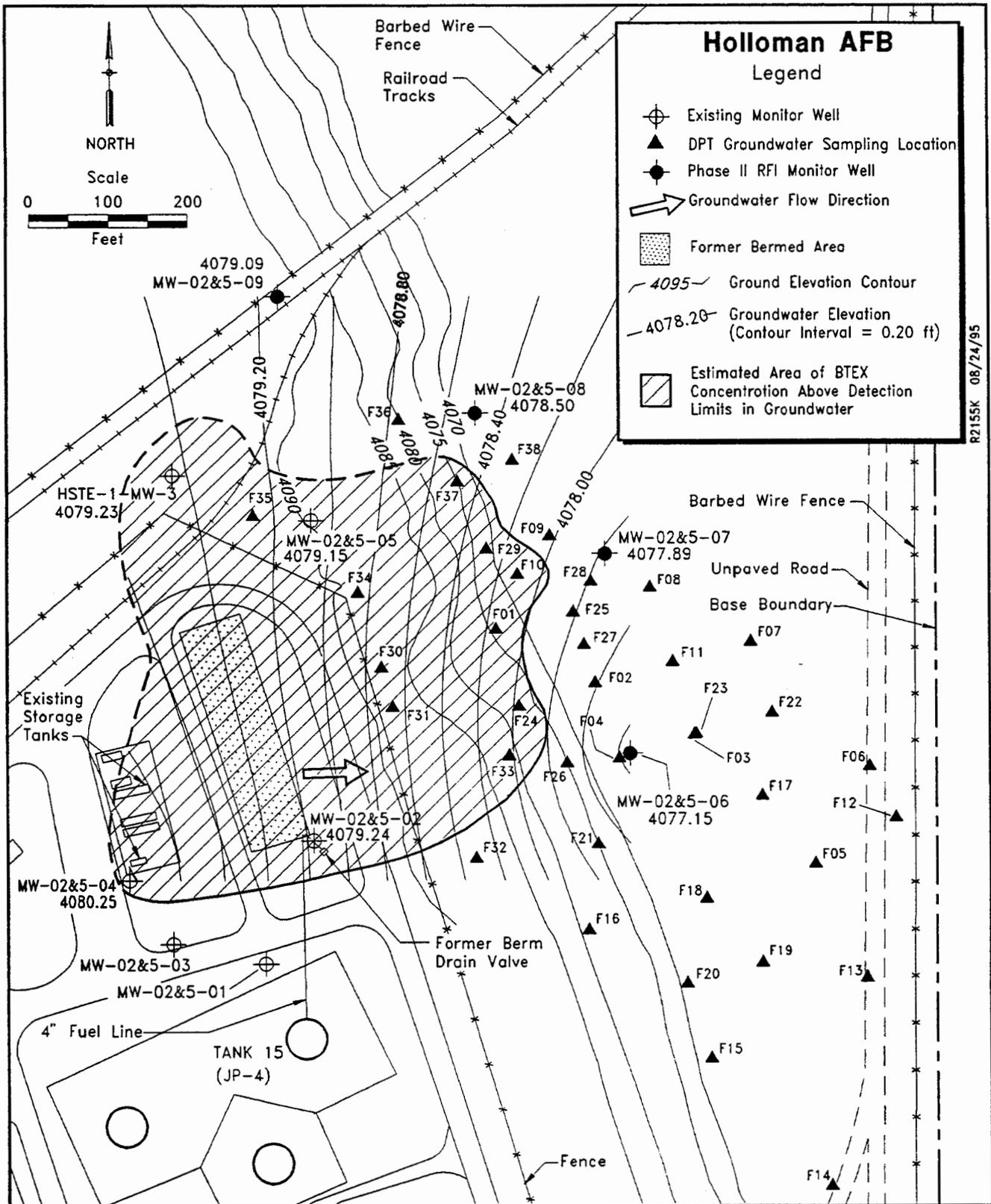


Figure 2-2. Map of Groundwater Sample Locations at IRP Sites SS-02 & SS-05

The source and lateral extent of soil contamination exceeding the cleanup criterion was delineated during a pre-design investigation conducted in 1993. The extent of groundwater contamination downgradient of the sites was determined during a Phase II RFI conducted in 1994.

The sites were combined and listed as AOC-T in the Hazardous and Solid Waste Amendment permit issued to Holloman AFB by U.S. EPA Region VI. AOC-T was included in a RCRA facilities assessment conducted in 1987. All of the investigations and studies performed for the sites met the requirements of the IRP and RCRA program.

### Highlights of Community Participation

Copies of the following reports have been made available to the public through the administrative record located at the Holloman and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b);
- *Corrective Measures Study Plan—Investigation, Study, and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Feasibility Study—Investigation Study, and Recommendation for 29 Waste Sites* (HAFB, 1993); and
- *Phase II RCRA Facility Investigation Report, Table I Solid Waste Management Units-Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the sites at these meetings.

This decision document presents the selected remedial action for the sites, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

Petroleum hydrocarbon concentrations in the soil at Sites SS-02 & SS-05 exceed the Base-specific cleanup level of 1000 mg/kg for TRPH. The selected remedial action to reduce the TRPH concentrations to the cleanup level is a soil vapor extraction system. In addition, by removing the soil contamination via the soil vapor extraction system, the contaminant source to groundwater will be removed.

In addition to the remedial action, a long-term groundwater monitoring program will be conducted at the sites to ensure the effectiveness of the remedial action.

## Summary of Site Characteristics

The IRP records search, conducted in 1983, indicated that petroleum contamination may be present at the sites as a result of past fuel spills. The presence and extent of petroleum hydrocarbons in the soil and groundwater beneath the site was determined during three investigations: the Phase I RI in 1991, the predesign investigation for the feasibility study in 1993, and the Phase II RFI in 1994. A summary of these investigations are presented below.

### Soil

During the Phase I RI, 16 soil borings were drilled to groundwater. Four of the borings were placed outside of the southeast corner of former bermed area in a low point near the former berm drain valve. The other 12 borings were placed inside the former bermed area. Samples were collected from the soil borings at 2.5-ft intervals for the first 10 ft and every 5 ft thereafter to groundwater. All soil samples were analyzed by a certified laboratory for VOCs, TRPH, organolead, and total metals.

TRPH and other fuel constituents were detected in 9 of the 16 borings. Most TRPH concentrations ranged from 14.3 to 766 mg/kg. Two TRPH concentrations outside that range (5820 and 17,500 mg/kg) were detected near the groundwater table in the southern portion of the mounded area. The highest concentrations were detected near the groundwater table, suggesting that the source had not been completely identified.

Nine soil borings were installed in the mounded area during the predesign investigation. Soil samples were collected and analyzed by a certified laboratory for TRPH. TRPH concentrations (1140 to 9930 mg/kg) exceeding the Base-specific cleanup level of 1000 mg/kg were detected extending from 4 ft bgl to groundwater (18 ft bgl). The estimated volume of affected soils exceeding the Base-specific cleanup level is 5150 yd<sup>3</sup>.

### Groundwater

Five groundwater monitor wells were installed at the site during the Phase I RI, and one round of samples were collected. Samples were analyzed by a certified laboratory for VOCs, organolead, anions, total metals, and total dissolved solids. With the exception of the upgradient well, petroleum contamination was detected in each well. The highest concentrations of BTEX (ranging from 2100 to 2900 µg/L benzene) were detected downgradient of the former tank locations.

Groundwater contamination was delineated at the sites during the Phase II RFI. Groundwater samples were collected from 38 temporary standpipes installed with a direct push technology rig. On the basis of field screening, four additional monitor wells were installed outside the area of contamination. Groundwater samples were collected from the four new wells and four existing wells. The samples were analyzed for BTEX by a certified laboratory. The highest concentrations of BTEX (ranging from 390 to 6600 µg/L benzene) were detected in the three wells immediately downgradient of the former tanks. Four additional monitor wells were installed at the sites during the Phase II RFI.

## Summary of Site Risks

A preliminary risk screen was conducted for Sites SS-02 and SS-05 as a part of the Phase I RI. The screen indicated that further assessment was necessary to quantify the risks posed by petroleum constituents in the soil. Holloman AFB conducted a corrective measures study in 1993 to quantify the risks and to determine health-based remedial action objectives. During the study, soils were determined not to pose an unacceptable risk to human health or the environment.

The risk-based screen also indicated that further assessment was necessary to evaluate contaminated groundwater discharging to Dillard Draw. The Phase II RFI evaluated the potential exposure pathways

resulting from contaminated groundwater discharging to Dillard Draw. Water level and ground surface elevation were taken from monitor wells at the sites. A comparison of the elevations indicates that groundwater does not discharge to the draw. No seeps or springs have been observed, and groundwater levels at Holloman AFB fluctuate less than 2 ft. Therefore, a groundwater exposure pathway via surface discharge is not present, and groundwater beneath the site does not pose an unacceptable risk to human health or the environment.

### Description of Alternatives

Because the sites were recommended for remedial action, a corrective measure study was conducted in 1992 to establish health-based remedial action objectives for soil contamination at the site. However, because the soil at the site does not pose unacceptable health risks, the Base-specific TRPH cleanup level of 1000 mg/kg was chosen to prevent further degradation of groundwater beneath the site. The remedial action objective and cleanup criteria were used during a feasibility study conducted in 1993 to evaluate the following seven remedial alternatives.

**No Action Alternative**—The no action alternative provides a baseline for comparison of the other alternatives. This alternative does not institute any type of remedial action to reduce the potential exposure, nor does it include institutional action, containment, excavation, treatment, or disposal technologies. The no action alternative relies entirely on natural processes for any reduction in the concentration of contaminants. The no action alternative is readily implementable and no capital or O&M costs are associated with this alternative.

**Source Containment Alternative**—This alternative involves capping the area of contamination with a clay cap to prevent rainwater from infiltrating the soil and causing constituents to leach into the groundwater. The cap would cover the 24,000-ft<sup>2</sup> former bermed area. No excavation, treatment, or disposal technologies are included in this alternative. As with the no action alternative, this alternative depends entirely on natural processes for reduction in constituent concentrations.

The actions to be instituted in the clay cap alternative are readily implementable. Adequate materials and labor resources exist to meet the requirements of this alternative. The capital cost for this alternative is estimated to be \$53,000. A 30-year period of performance is assumed for this alternative. The annual O&M costs are estimated to be \$5300, yielding a total cost of \$130,000.

**In Situ Treatment (Soil Vapor Extraction/ Bioventing) Alternative**—This alternative uses four soil vapor extraction (SVE) wells to reduce the TRPH concentrations in the unsaturated soil. The SVE wells would be drilled to a depth of 13 ft bgl and screened in the vadose zone from 8-12 ft bgl. The off gas from the extraction system would then be treated by a vapor-phase granular activated carbon (GAC) adsorption unit to remove the VOCs. A 6-in. clay cap would also be installed over the former bermed area (24,000 ft<sup>2</sup>) to prevent the soil vacuum from causing channeling.

This alternative is readily implementable. SVE technology has proved to be reliable and has been demonstrated in full-scale remediation projects. The capital cost for this alternative is estimated to be \$290,000, most of which is due to installation of the SVE system. The annual O&M costs are estimated to be \$82,000. Remediation using SVE could be completed within approximately four years after design completion. Groundwater monitoring would continue annually while the system is in operation. The total costs for this alternative would be \$510,000.

**In Situ Treatment (Biosparging with SVE) Alternative**—This alternative involves uses in situ biosparging and SVE to provide a suitable environment for indigenous microorganisms. Twelve air injection wells would be drilled to a depth of 27 ft bgl and screened from 24-27 ft bgl. Nitrate and phosphate would be added to the

soil through the sparging system to allow effective biodegradation. In addition to the air injection wells, the actions instituted in the SVE/bioventing alternative would be implemented.

This alternative is considered to be implementable. However, the reliability of biosparging for the subsurface conditions at the sites is not certain. The capital cost for this alternative is estimated to be \$500,000, most of which is due to installation of the biosparging and SVE systems. The annual O&M costs are estimated to be \$130,000. It is estimated that remediation using SVE could be completed within four years after design completion. Groundwater monitoring would continue annually while the system is in operation. The total costs for this alternative would be \$850,000.

**Excavation, On-site Thermal Treatment, and On-site Disposal Alternative**—This alternative involves excavation and on-site treatment of soils with constituent concentrations above the cleanup criteria. A front-end loader would be used to excavate the contaminated soil. An estimated 5800 yd<sup>3</sup> of soil would then be treated in a portable infrared thermal desorption unit located at Holloman AFB. The treated soil would be used to backfill the excavation.

This alternative is considered to be implementable. However, infrared thermal desorption technology has not been widely tested in full-scale remediation projects and the presence of buried concrete tank saddles and piping may impede excavation. The capital cost for this alternative is estimated to be \$1,800,000, most of which is due to the cost of operating the thermal desorption system and excavation. No O&M costs are associated with this alternative. Remediation could be completed within one year after design completion.

**Excavation and Off-site Disposal Alternative**—This alternative involves excavation and off-site disposal of soils with constituent concentrations above the cleanup criteria. A front-end loader would be used to excavate the contaminated soil. An estimated 5800 yd<sup>3</sup> of soil would be transported and disposed of in a industrial solid waste landfill. This alternative is based on the assumption that the soil does not contain a hazardous waste. The excavation would be backfilled with clean soil obtained from other areas of the Base.

The implementation of this alternative may be difficult due to the presence of buried concrete tank saddles and piping may interfere with excavation. The capital cost for this alternative is estimated to be \$1,500,000, most of which is due to the cost of excavating, transporting, and landfilling the soil. No O&M costs are associated with this alternative. Remediation could be completed within one year after design completion.

### Summary of Comparative Analysis of Alternatives

During the initial review of the proposed alternatives during the feasibility study, four alternatives were selected to receive no further consideration: 1) the clay cap alternative; 2) the in situ biosparging with SVE alternative; 3) the excavation, on-site thermal treatment, and on-site disposal alternative; and 4) the excavation and off-site disposal alternative. The clay cap alternative was eliminated from further consideration because it would not meet the remedial action objectives. The in situ biosparging with SVE alternative was eliminated because of the uncertainty associated with biosparging and because the alternative is less cost efficient relative to the in situ SVE alternative while providing similar remediation efficiency. The excavation-based alternatives were eliminated because of the difficulty of removing the buried concrete tank saddles and piping at the sites.

The two remaining alternatives (the no action alternative and the SVE/bioventing alternative) were compared in a detailed analysis. The results of this comparative analysis are present in Table 2-1.

**Table 2-1**  
**Comparative Analysis of Alternatives for Sites SS-02 & SS-05**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Soil Vapor Extraction/Bioventing</b>
<b>OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT</b>		
Protection of Human Health	Protective of human health, since no risk exists currently.	Protective of human health.
Protection of Environment	Would allow future contamination of groundwater.	Should prevent future contamination of groundwater.
<b>COMPLIANCE WITH ARARS</b>		
Chemical-Specific ARARS	Would not meet ARARS.	Could meet ARARS and RAO within 6 years after design completion.
Location-Specific ARARS	Not relevant. There are no location-specific ARARS.	Not relevant. There are no location-specific ARARS.
Action-Specific ARARS	No action-specific ARARS were identified, since this is the no- action alternative.	Should meet action-specific ARARS.
Other Criteria and Guidance	No other criteria.	No other criteria.
<b>LONG-TERM EFFECTIVENESS AND PERMANENCE</b>		
Magnitude of Residual Risk	No reduction in risk of contamination of groundwater.	Should reduce residual risk of contamination to acceptable levels.
Adequacy and Reliability of Controls	No controls over existing contamination. No reliability.	Risk to groundwater is controlled through SVE, which has been well proved in full-scale remediation projects.
Need for 5-Year Review	Review would be required.	Review would be required to ensure that remediation actions are successful.
<b>REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT</b>		
Treatment Process Used	None.	SVE and in situ biodegradation
Amount of Hazardous Materials Destroyed or Treated	None.	Approximately 75% of the organic contaminants could be destroyed or removed.
Reduction of Toxicity, Mobility or Volume	None.	The volume of organic contaminants could be reduced by 75%. Concentrations could be reduced to cleanup levels.
Irreversibility of Treatment	Not applicable.	SVE and biodegradation are irreversible technologies.
Type and Quantity of Residuals Remaining After Treatment	No treatment residuals.	Soil with contaminant concentrations below acceptable levels would remain. Hazardous residuals (excavated soil and spent carbon) would be removed from the site.
Statutory Preference for Treatment	Does not satisfy.	Satisfies.
Statutory Preference for On-Site Management of Waste	Satisfies.	Satisfies.

**Table 2-1  
(Continued)**

Evaluation Criteria	No Action	Soil Vapor Extraction/Bioventing
<b>SHORT-TERM EFFECTIVENESS</b>		
Protection of Community	No change in risk to the community.	Drilling may release some dust and odors to the air.
Protection of Workers	No risk to workers.	Protection required against dermal contact with, and inhalation of, VOCs and dust during construction and drilling for the SVE systems.
Environmental Impacts	Continued impact to groundwater from existing conditions.	No adverse environmental impacts expected.
Time Requirements to Achieve RAOs	Indefinite.	SVE and biodegradation complete within six years after design completion. Could meet RAOs within six years after design completion.
<b>IMPLEMENTABILITY</b>		
Ability to Construct and Operate	No construction or operation.	SVE requires construction. Buried concrete tank saddles may cause difficulties in drilling. Some difficulties in operation may be encountered.
Reliability of Technology	No technologies are used.	SVE is a proven technology. Biodegradation of petroleum hydrocarbons has also been demonstrated to be effective.
Ease of Carrying Out Additional Remedial Action If Necessary	No action would not significantly hinder implementation of future remedial actions.	SVE could be expanded to cover a larger area if deemed necessary. Proposed actions should not substantially hinder implementation of other technologies.
Ability to Monitor Effectiveness of Remedial Actions	Base-wide groundwater monitoring program would allow adequate monitoring of site conditions.	Proposed actions should allow adequate monitoring of site conditions.
Ability to Obtain Approvals and Coordinate with Other Agencies	No approval necessary.	Need approval from EPA and NMED. Should not be difficult to obtain.
Availability of TDS facilities	Not applicable.	Needed disposal facilities for drilling cuttings and excavated soils are readily available. Regeneration facilities are available for spent carbon.
Availability of Required Equipment and Specialists	Not applicable.	Needed equipment and specialists are available.
Availability of Required Materials and Services	Not applicable.	Needed materials and services are available.
Availability of Prospective Technologies	No remedial technologies required.	SVE technologies are available from several vendors.
<b>COST</b>		
Capital Cost	\$0	\$270,000
Annual O&M Cost	\$0	\$63,000
Present Worth Cost	\$0	\$540,000

## Selected Remedy

On the basis of the comparison of alternatives, the in situ SVE/bioventing alternative was selected during the feasibility study conducted in 1993. The U.S. EPA Region VI determined that this alternative fulfills the selection criteria requirements. Holloman AFB executed the selected remedy in 1994. The SVE system has been installed and is currently operating. Four SVE wells were installed to reduce TRPH concentrations in the vadose zone. The off-gas from the extraction system will be treated when above regulatory limits by a vapor-phase GAC adsorption unit to remove VOCs or the flow rate will be reduced. Soil gas monitor probes were installed along the perimeter of the mounded area to monitor the effectiveness of the SVE system. On the basis of initial site studies, a clay cap is not required to prevent channeling at the site and was not constructed. The selected remedy is presented in Figure 2-3.

The total treatment time for this remedy is estimated to be four years. Upon completion of the remedial activities, confirmation sampling for TRPH will be conducted to confirm that petroleum concentrations in the soil are at or below 1000 mg/kg. The approximate cost to install this system is was \$550,000; the total cost is estimated to be \$700,000.

In addition to the selected remedy, a long-term monitoring program will be initiated at the site to ensure that the remedy continues to be protective of human health and the environment. A long-term monitoring work plan will be submitted by Holloman AFB for approval by the NMED.

## Statutory Determination

The selected remedial alternative meets the statutory requirements of CERCLA Section 121. A brief description of the statutory requirements and compliance with each evaluation criterion is provided in this section.

**Overall protection of human health and the environment**—The proposed remedy is expected to reduce the petroleum concentrations in the soil below 1000 mg/kg, which is the cleanup level. Implementation of the in situ treatment should prevent future contamination of the groundwater.

**Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**—The proposed remedy complies with all ARARs identified in the feasibility study.

**Long-term effectiveness and permanence**—After remedial activities are completed, the concentrations of TRPH in the soil will be at or below 1000 mg/kg. The residual contaminants should not pose a risk to future contamination of the groundwater. Periodic reviews will be performed to determine the degree to which the remediation has been successful. The SVE system will remove the VOCs from the contaminated soil. Furthermore, natural bioremediation of the soil will also reduce the concentration of petroleum hydrocarbons.

**Reduction of toxicity, mobility, or volume through treatment**—The proposed remedy will significantly reduce the mass and volume of the contaminants in the soil. It is estimated that approximately 75% of the organic compounds from the fuel will be removed or degraded in lowering the TRPH concentration from an average of approximately 4000 mg/kg to below 1000 mg/kg. The SVE and biodegradation processes are irreversible. Some organic compounds may remain in the soil at the end of the remediation period. The remaining contaminants will exist in concentrations below the cleanup level of 1000 mg/kg for TRPH. The toxicity of the remaining contaminants should continue to decrease by natural biodegradation processes.

**Short-term effectiveness**—The proposed remedy will be completed within four years.

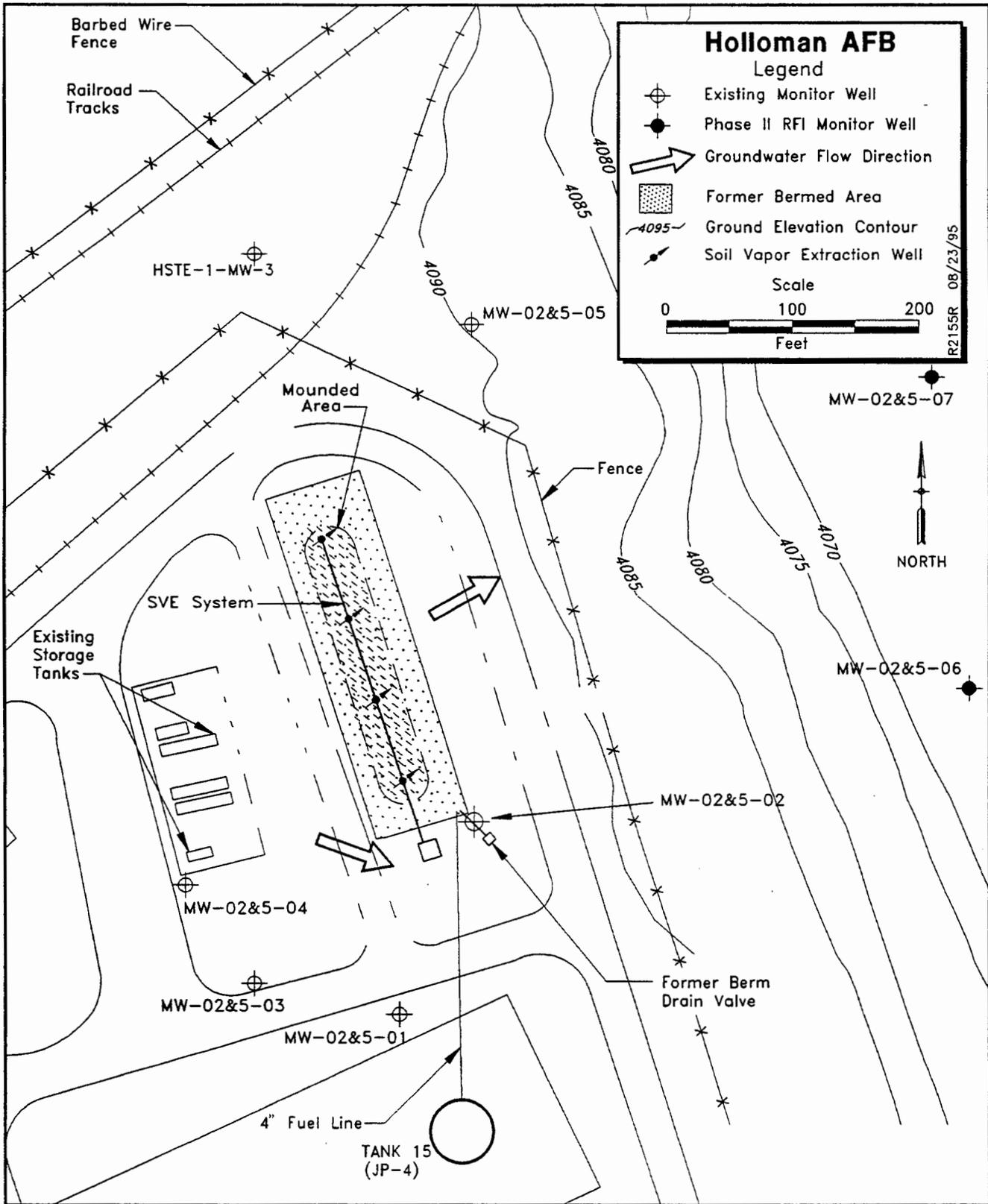


Figure 2-3. Map of Selected Remedy for IRP Sites SS-02 & SS-05

**Implementability**—SVE systems have been implemented extensively and have been widely proven in remediation projects much larger and complex than the proposed site.

**Cost**—The proposed remedy is estimated to cost \$700,000.

**Regulatory acceptance**—The U.S. EPA Region VI and the NMED have reviewed and accepted the proposed remedy.

**Community acceptance**—Holloman AFB held semiannual public meetings to discuss proposed actions at IRP sites on the Base. No comments were received during those meetings pertaining to the site.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

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## Declaration

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### Statutory Preference for Treatment as a Principal Element is not Applicable and a Five-Year Review is not Required

#### Site Name and Location

IRP Site OT-03 (RCRA SWMU 114)  
POL Tank Sludge Burial Site  
Holloman Air Force Base, New Mexico

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the referenced site, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

#### Description of the Selected Remedy: No Action

Site investigations and a risk assessment conducted for the site indicated that no action is necessary to protect human health and the environment. However, a voluntary remedial action was conducted to remove petroleum-contaminated soils exceeding the NMED cleanup level for Holloman AFB. As part of the no action remedy, a long-term groundwater monitoring program will be initiated.

#### Declaration Statement

The remedial investigation, associated risk assessment, RCRA facility investigation, and voluntary remedial action conducted for the site indicate that conditions at the site do not require action to ensure the protection of human health and the environment. Because no hazardous substances will remain on site above health-based levels, a five-year review is not necessary.

If new evidence suggesting the need for further action becomes available, the site closeout decision may be changed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.

  
\_\_\_\_\_  
Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Bruce Carlson  
Brigadier General, USAF Commander

  
\_\_\_\_\_  
Date

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## Decision Summary

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### Site Name and Location

IRP Site OT-03, the POL Tank Sludge Burial site, is located adjacent to a fence in the eastern portion of the POL Storage Yard. The POL Storage Yard is located east of the Main Base. The topography of the site is gently sloping from the northeast to southwest, but immediately east of the site the land surface dips rather steeply to the east toward Dillard Draw. Dillard Draw is a surface drainage feature located adjacent to the eastern boundary of the site. The ground surface of the site is generally void of vegetation. IRP Sites SS-02 & SS-05 (POL Spill Sites No. 1 & No. 2) are located adjacent and upgradient of the site. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consists primarily of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. The regional groundwater flow direction is controlled by southwest-trending arroyos and is to the southwest, following the Dillard Draw surficial drainage system (see Figure 1-2). At Site OT-03, groundwater occurs approximately 15 ft bgl and flows to the east, toward Dillard Draw.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

From 1955 to 1975 wastes including leaded fuel tank sludge, iron fragments, dark red-stained soil, and rags were disposed of in a shallow unlined pit directly west of the POL area.

In 1983, Site OT-03 was identified as a potential contaminant source during an IRP records search. As a result, the site was included in a Phase I RI completed in 1992. Results of the Phase I RI indicated that petroleum contamination was present in the soil and groundwater beneath the site. Because TRPH concentrations detected in the soil exceeded the Base-specific cleanup level, the site was recommended for remedial action. Holloman AFB, during a voluntary remedial action in 1994, removed the TRPH-contaminated soil from above the water table. The extent of groundwater contamination was delineated during a Phase II RFI conducted in 1994. Groundwater quality will be monitored as part of a long-term monitoring program conducted for adjacent Sites SS-02 & SS-05.

The site is listed as SWMU 114 on the Hazardous and Solid Waste Amendment permit issued to Holloman AFB by U.S. EPA Region VI. This SWMU was included in a RCRA facility assessment in 1987. The investigation and studies performed for the site met the requirements of the IRP and RCRA program.

### Highlights of Community Participation

Copies of the following reports, which contain information pertaining to the site, are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

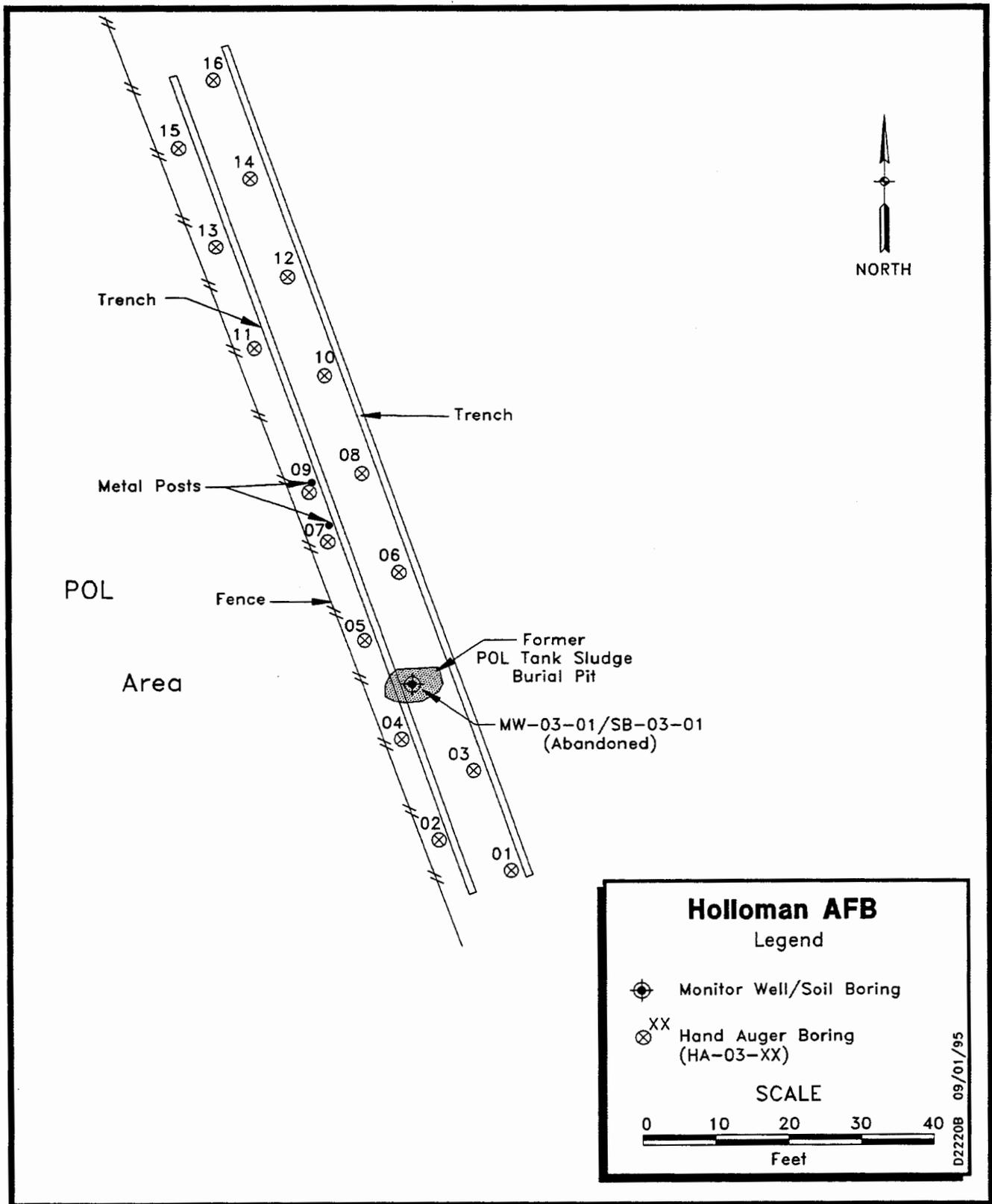


Figure 2-1. Map of IRP Site OT-03

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b); and
- *Phase II RCRA Facility Investigation Report, Table I Solid Waste Management Units, Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### **Scope and Role of the Response Action**

Petroleum hydrocarbon concentrations in the soil at Site OT-03 exceeded the Base-specific cleanup level of 1000 mg/kg for TRPH. Holloman AFB conducted a voluntary remedial action in 1994 to remove petroleum-contaminated soil exceeding the cleanup level from above the water table. The voluntary remedial action eliminated the site as a continued contaminant source to groundwater.

The site investigations, risk assessment, and voluntary remedial action, indicate that no action is necessary to protect human health and the environment under CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. As part of the no action remedy, a long-term groundwater monitoring program will be initiated to ensure the effectiveness of the remedial action at Site OT-03.

### **Summary of Site Characteristics**

The IRP record search, conducted in 1983, indicated that petroleum contamination may be present at the site as a result of past disposal practices. Petroleum contamination in the soil and groundwater beneath the site, was confirmed during a Phase I RI conducted in 1991. Soils exceeding the Base-specific cleanup level for TRPH were excavated during a voluntary remedial action in 1994. A Phase II RFI conducted in 1994 for Sites SS-02 & SS-05, delineated groundwater contamination associated with Site OT-03 and Sites SS-02 & SS-05. A summary of the field investigations is presented below.

Prior to soil sampling and monitor well installation, two 120-ft-long trenches were dug with a backhoe to confirm the location and determine the extent of the burial pit. As illustrated on the map of Site OT-03, the two trenches were dug parallel to the fence. The burial pit location was originally reported to be between two metal posts, shown on the site map. However, trenching activities uncovered the burial pit 30 ft south of the metal posts. Confirming previous reports, waste within the pit consisted of rusty metallic material, dark soil, and oily rags. The pit was approximately 2 ft wide, 6 ft long, and 5 ft deep. There was some evidence of soil disturbance between the metal posts but only a thin (0.02 ft) discontinuous layer of rusty material was found approximately 0.6 ft bgl. No waste was encountered in this area.

### Soil

Sixteen surface soil samples were collected adjacent to the trenches and analyzed by a certified laboratory for organolead and total lead to determine the surficial extent of disposal activities. Organolead was not detected in any of the surface soil samples. Total lead was detected in only one surface sample (38 mg/kg) above the established background levels for Holloman AFB. The sample was collected from a location near the metal posts.

One soil boring was drilled through the waste burial pit, and samples were collected continuously to identify the materials in the pit. A composite sample of the waste material was collected and analyzed for VOCs, TRPH, organolead, and total metals. In addition to the waste sample, a sample of the soil below the pit was collected and analyzed for VOCs, TRPH, organolead, and total metals.

Lead was detected in the waste sample (50 mg/kg) and in the underlying soil sample (48 mg/kg) at concentrations exceeding the established background level. TRPH was detected in the waste sample (1160 mg/kg) and in the underlying soil (2020 mg/kg). Low levels of VOCs were also detected in waste and underlying soil samples, with higher concentrations occurring in the waste sample.

### Groundwater

After soil samples had been collected, the soil boring was completed as a monitor well to determine whether a release to groundwater had occurred. A groundwater sample was collected and analyzed by a certified laboratory for VOCs, anions, total dissolved solids, organolead, and total metals. Groundwater quality properties were measured within their natural background ranges. With the exception of lead (19 µg/L), all metals were detected at concentrations below the established background levels. Several VOCs were detected in the groundwater, including benzene, ethylbenzene, and xylene at concentrations of 4500, 1600, and 700 µg/L, respectively. However, the elevated VOCs and lead concentrations detected in the groundwater are likely related to fuel spills associated with Sites SS-02 & SS-05 located less than 50 ft upgradient.

An extensive groundwater investigation, conducted for Sites SS-02 & SS-05 during a Phase II RFI, delineated the extent of contamination downgradient of both Site OT-03 and Sites SS-02 & SS-05.

### Summary of Site Risks

A preliminary risk-based screen was conducted for the site as part of the Phase I RI. The screen indicated that further assessment was necessary to quantify the risks posed by petroleum constituents in the soil. However, owing to the limited volume of petroleum-contaminated soil, a further assessment of risk was not conducted. Instead, Holloman AFB excavated the soils exceeding the Base-specific cleanup level during a voluntary remedial action in 1994. The remedial action removed the soil contaminants at the site, and therefore, eliminated potential risk posed by soil contamination.

The screen identified benzene contamination in groundwater as a potential threat to human health via recreational exposure to children. The potential exposure pathway consisted of contaminated groundwater discharging to Dillard Draw via seeps and springs. This exposure pathway was evaluated during the Phase II RFI. Water level and ground surface elevations of monitor wells located in the vicinity of the sites were compared. The comparison indicates that groundwater does not discharge to the draw. No seeps or springs have been observed, and groundwater levels at Holloman AFB fluctuate less than 2 ft. Therefore, a groundwater exposure pathway via surface discharge is not present.

### **Description of the Selected Alternative**

Because of the limited amount of contaminated soil exceeding the Base-specific cleanup level of 1000 mg/kg for TRPH, Holloman AFB conducted a voluntary remedial action in 1994 without conducting a feasibility study. Approximately 60 yd<sup>3</sup> of contaminated soil were excavated from the site. The excavation extended to approximately 15 ft bgl and intersected the water table. Confirmation sampling indicated that the horizontal extent of contamination had been removed and that soil below the water table contained TRPH concentrations above the cleanup level. However, an agreement between Holloman AFB and the NMED does not require remediation of soils below the water table.

Groundwater quality in the vicinity of Site OT-03 will be monitored by the long-term monitoring program to be established for Sites SS-02 & SS-05. A long-term groundwater monitoring work plan will be submitted by Holloman AFB for approval by the NMED.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

## Declaration

### Statutory Preference for Treatment as a Principal Element is not Applicable and a Five-Year Review is not Required

#### Site Name and Location

IRP Site OT-04 (RCRA SWMU 102)  
Acid Trailer Burial Site  
Holloman Air Force Base, New Mexico

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the referenced site chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the selected remedy.

#### Description of the Selected Remedy: No Action

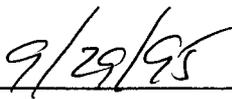
Site investigations and a voluntary remedial action conducted for the site indicate that no action is necessary to protect human health and the environment. As part of the no action remedy, debris was removed from the site and a chain-link fence was erected to prohibit unauthorized access.

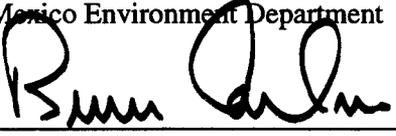
#### Declaration Statement

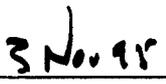
The remedial investigation, the associated risk assessment, a voluntary remedial action, and the RCRA facilities investigation conducted for the site indicate that conditions at the site do not require further action to ensure the protection of human health and the environment. Because no hazardous substances will remain on site above health-based levels, a five-year review is not necessary.

If new evidence suggesting the need for further action becomes available, the site closeout decision may be changed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.

  
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Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

  
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Date

  
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Bruce Carlson  
Brigadier General, USAF Commander

  
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Date

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## Decision Summary

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### Site Name, Location, and Description

IRP Site OT-04, the Acid Trailer Burial site, is located in the northern portion of Holloman AFB, one-half mile north of the Unconventional Fuels Storage Area (IRP Site SS-36). The site is bordered to the north by Rita's Draw, which is an arroyo running west to east through the northern portion of the base. Topography in the area is moderately steep as a result of the draw. A relief of approximately 35 ft exists between the southern and northern portions of the site. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow direction is controlled by southwest-trending arroyos and is to the west, following the Rita's Draw surficial drainage system (see Figure 1-2). At Site OT-04, groundwater occurs at approximately 3 ft bgl in the arroyo, and approximately 40 ft bgl in the southern portion of the site. Groundwater flows from the site to the northwest, toward Rita's Draw.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

The IRP records search conducted in 1983 for the Site OT-04 indicated that various debris was disposed of at the site. The exact dates of disposal activities are unknown, but some disposal occurred in the 1950s. During a site visit, the following debris was observed on site: a partially buried tank trailer, an empty unlabeled 55-gal. stainless steel drum, rocket engines, a fuselage, approximately twenty 1-quart amber bottles filled with solid compounds, and various other debris. An empty, fuming nitric acid transport trailer was buried at the site, circa 1958. The trailer was reported to have been washed out with water prior to burial. The majority of debris disposed of at the site may have come from the former Unconventional Fuels Storage Area, which was used to store propellants, oxidizers, and other fuel components.

A Phase I RI conducted in 1991 indicated that debris was present at the site. Elevated levels of selenium were detected in the groundwater beneath the site. Owing to the uncertainty surrounding the source of selenium, a Base-wide background study was conducted in 1993. A voluntary remedial action was conducted by Holloman AFB in 1994 to remove the debris and restrict access to the site. A Phase II RFI conducted in 1994 confirmed that selenium concentrations at the site are below the established background level.

The site is listed as SWMU 102 in the Hazardous and Solid Waste Amendment permit issued to Holloman AFB by U.S. EPA Region VI. This SWMU was included in a RCRA facility assessment in 1987. The investigations and studies performed for the site met all the requirements of the IRP and RCRA program.

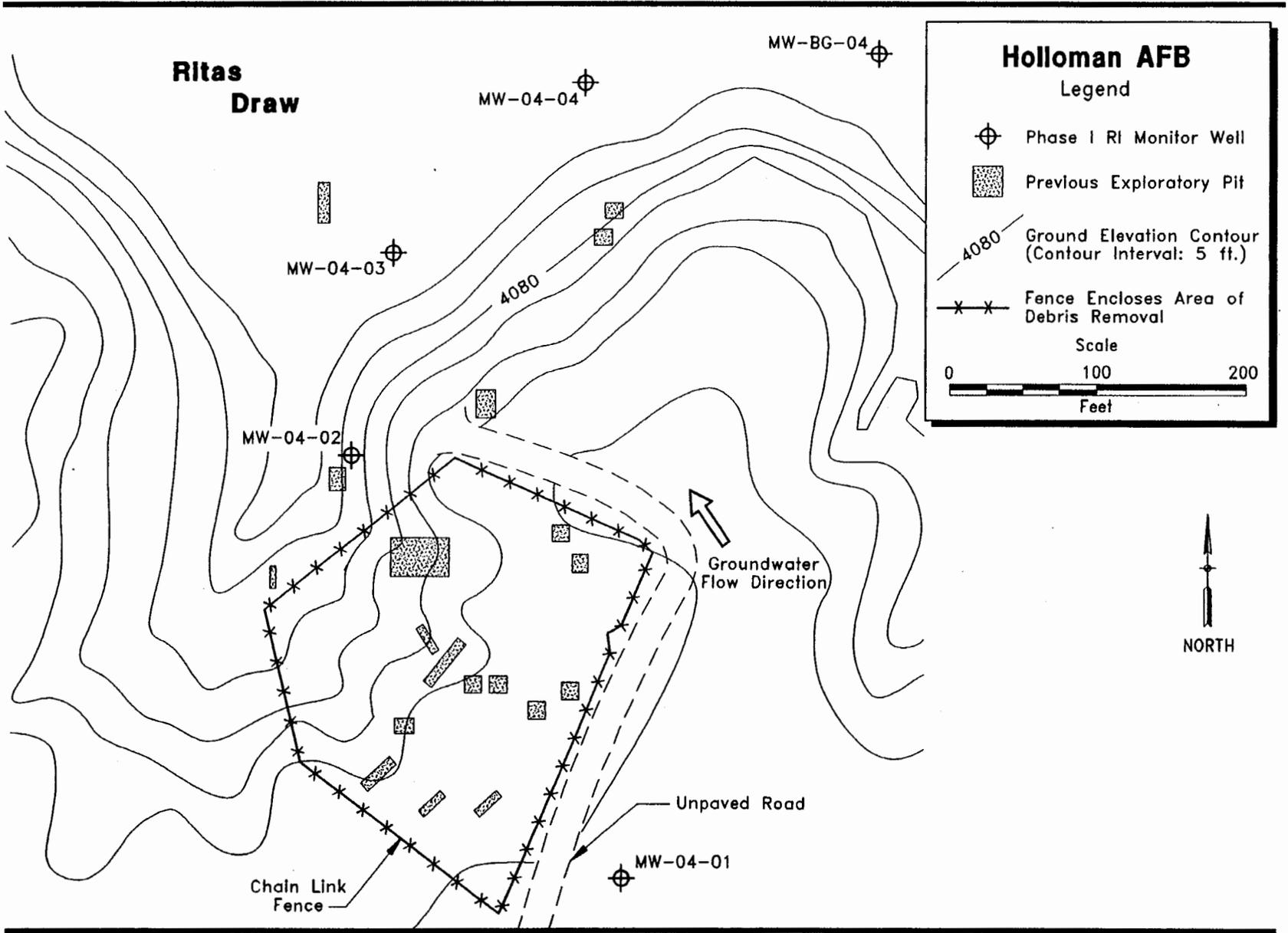


Figure 2-1. Map of Site OT-04

## Highlights of Community Participation

Copies of the following reports, which contain information pertaining to the site, are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b); and
- *Phase II RCRA Facility Investigation Report, Table I Solid Waste Management Units, Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

## Scope and Role of the Response Action

Debris present at the site pose a potential risk to human health. To mitigate the risk, Holloman AFB conducted a voluntary remedial action. The debris was removed and a chain-link fence was erected to restrict access.

The Phase I RI, risk assessment, the Phase II RFI, and the voluntary remedial action conducted for the site indicate that no further action is necessary at Site OT-04 to protect human health or the environment under CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

## Summary of Site Characteristics

The IRP records search conducted in 1983 indicated that debris may have been dumped along the banks of an arroyo. This finding was confirmed during the Phase I RI conducted in 1991. Holloman AFB conducted a Base-wide background study in 1993, and a Table II RFI in 1994. A summary of these investigations is presented below.

### Waste Identification

During the Phase I RI, an electromagnetic survey was performed to determine the locations of any buried debris. On the basis of the survey results, 19 exploratory pits were dug. Materials encountered in the exploratory pits included solid rocket boosters, laboratory equipment, more than 100 amber bottles containing chemicals, metal debris, and an empty stainless steel tanker car. Wipe samples taken from the walls of the tanker car indicated that the pH was not corrosive. Seven amber bottles were either suspected of or identified as containing picric acid (an explosive) and were removed and disposed of by the Base Ordnance Detachment. After hazard identification, the remaining amber bottles were also removed from the site.

**Groundwater**

Four groundwater monitor wells were installed at the site during the Phase I RI. One round of samples was collected and analyzed for VOCs, anions, total metals, TRPH, and total dissolved solids. The only constituent detected above background levels detected in upgradient monitor wells was selenium.

Because of the uncertainty surrounding the selenium concentrations at the site, a Base-wide groundwater background study established naturally-occurring concentrations at Holloman AFB. One monitor well was installed northeast of the site as part of the study.

Although the Phase I RI results were below the established background level for selenium, a Phase II RFI was conducted in 1994 to confirm the selenium concentrations at the site. Groundwater samples were collected from three of four existing monitor wells at the site and the background well. The fifth well was not sampled because it had been sheared at approximately 8 ft bgl. The shearing of the well may be due to the slumping of sediments in the small drainage in which it is located. All groundwater samples collected at the site were analyzed by a certified laboratory for total (unfiltered) selenium. None of the samples contained total selenium concentrations in excess of the established background level (0.079 mg/L) for Holloman AFB. Therefore, the results indicate that the detected selenium concentrations occur naturally in the groundwater at this site and are not the result of past waste disposal activities.

**Summary of Site Risks**

The immediate human health risk posed by the debris at the site was eliminated during a voluntary remedial action. The risk assessment conducted for the site indicated that no human receptors were identified for the site because of its remote location. The risk assessment initially identified the White Sands pupfish as a potential environmental receptor. However, because selenium concentrations at the site do not exceed the established background level, the site does not pose an unacceptable risk to human health or the environment.

**Description of Selected Alternative**

Potentially explosive material was encountered at the site. To mitigate the potential risk to human health, a warning fence was installed to restrict access to the site. Holloman AFB conducted a voluntary remedial action in 1994 which consisted of searching the site for debris, characterizing the debris, and removing it. A chain-link fence was erected to further restrict access. The site investigations and voluntary remedial action conducted for the site indicate that no further action is necessary to protect human health and the environment.

**Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

## Declaration

### Statutory Preference for Treatment as a Principal Element is Applicable and a Five-Year Review is Required

#### Site Name and Location

IRP Site SD-08 (RCRA SWMU 82)  
Refuse Collection Truck Washrack  
Holloman Air Force Base, New Mexico

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the referenced site chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the selected remedy.

#### Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this decision document, may present a current or potential threat to public health, welfare, or the environment.

#### Description of the Selected Remedy

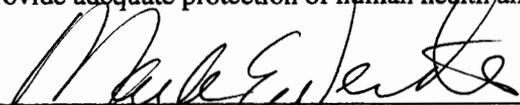
The selected remedy will reduce the risks associated with exposure to pesticide-contaminated soils at the site and will reduce the potential for infiltration of contaminants to groundwater. The major components of the selected remedy include the following:

- Placement of an impermeable cap over the affected soils;
- Installation of a chain-link fence to restrict access to the site;
- Annual inspection and maintenance of the cap; and
- Long-term groundwater monitoring to ensure the effectiveness of the remedial action.

#### Declaration Statement

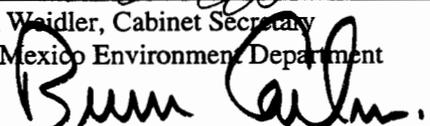
The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical and satisfies the statutory preferences for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.



Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

9/29/95  
Date



Bruce Carlson  
Brigadier General, USAF Commander

3 Nov 95  
Date

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## Decision Summary

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### Site Name, Location and Description

IRP Site SD-08, the Refuse Collection Truck Washrack, is located in the southeastern corner of the refuse collection yard, near Building 131. The yard is located southwest of the POL Storage Area and east of the Main Base area. The yard is enclosed by a chain-link fence. Refuse collection trucks and dumpsters are routinely stored in the yard. At the washrack, the trucks, dumpsters, and other refuse collection equipment are washed with soap and water. An office trailer is located in the southern corner of the yard, southwest of the washrack. The topography of the site is generally flat. The yard is unpaved and has sparse vegetation only along the fence. Figure 1-1 shows the location of Site SD-08 on Holloman AFB, and Figures 2-1 and 2-2 show the site layout.

Soils at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow direction is controlled by southwest-trending arroyos, and is to the southwest, following the Dillard Draw surface drainage system (see Figure 1-2). At Site OT-08, groundwater occurs at 8 to 12 ft bgl, and flows to the northeast toward Dillard Draw.

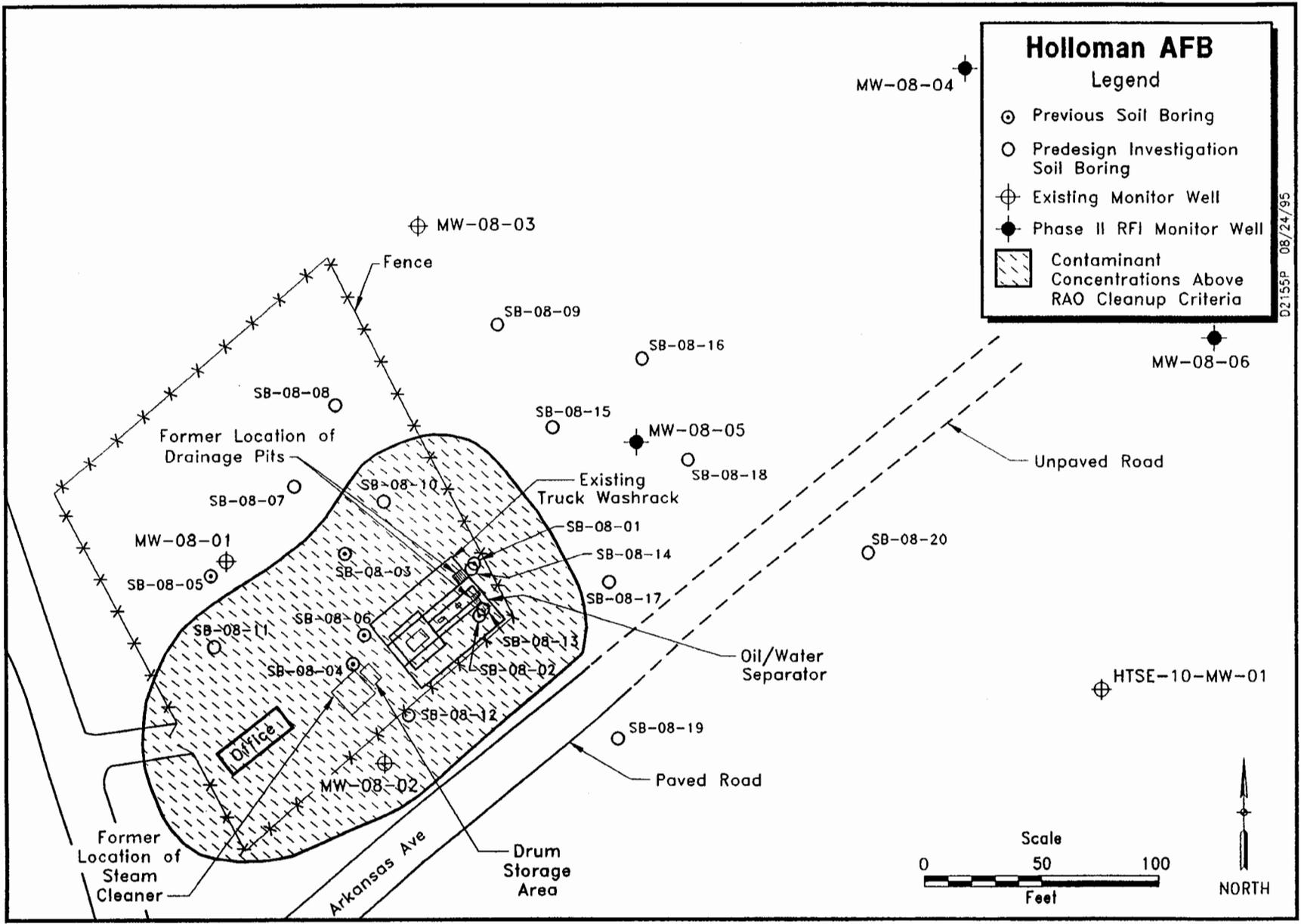
The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on the NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

The Refuse Collection Truck Washrack was installed in 1942. Base records indicate that throughout the 1970s, pesticides were routinely sprayed inside the trucks for fly control; however, this practice ceased in 1981. Drains located at the north end of the washrack connected to a sewer line that carried wastewater to an oil/water separator near the northwest corner of the washrack. According to site personnel, it was common for the sewer line to clog, causing the sump and oil/water separator to overflow onto the surrounding soil. The washrack contained cracks in the concrete and was replaced in 1992 with a new washrack in the same place.

Site SD-08 was identified as a potential contaminant source during an IRP records search conducted in 1983. As a result, the site was included in a Phase I RI completed in 1992. Results of the investigation indicated that pesticide contamination was present in the shallow soil and that a remedial action was necessary to protect human health and the environment. After reviewing the Phase I RI report, the U.S. EPA Region VI agreed with the conclusion and requested that additional soil borings and groundwater samples be collected to fully define the extent of contamination. A predesign investigation was conducted in 1993 in conjunction with the feasibility study to obtain additional soil data. The feasibility study which was performed to recommend appropriate remedial actions, was completed in 1993. Groundwater contamination was delineated during a Phase II RFI completed in 1995.

The site is listed as SWMU 82 in the Hazardous and Solid Waste Amendments permit issued to Holloman AFB by the U.S. EPA Region VI. This SWMU was investigated during a RCRA facility assessment conducted in 1992. The investigations and studies performed for the site met the requirements of the IRP and RCRA program.



D2155P 08/24/95

Figure 2-1 Soil Sample Locations at IRP Site SD-08

02222C 08/05/95

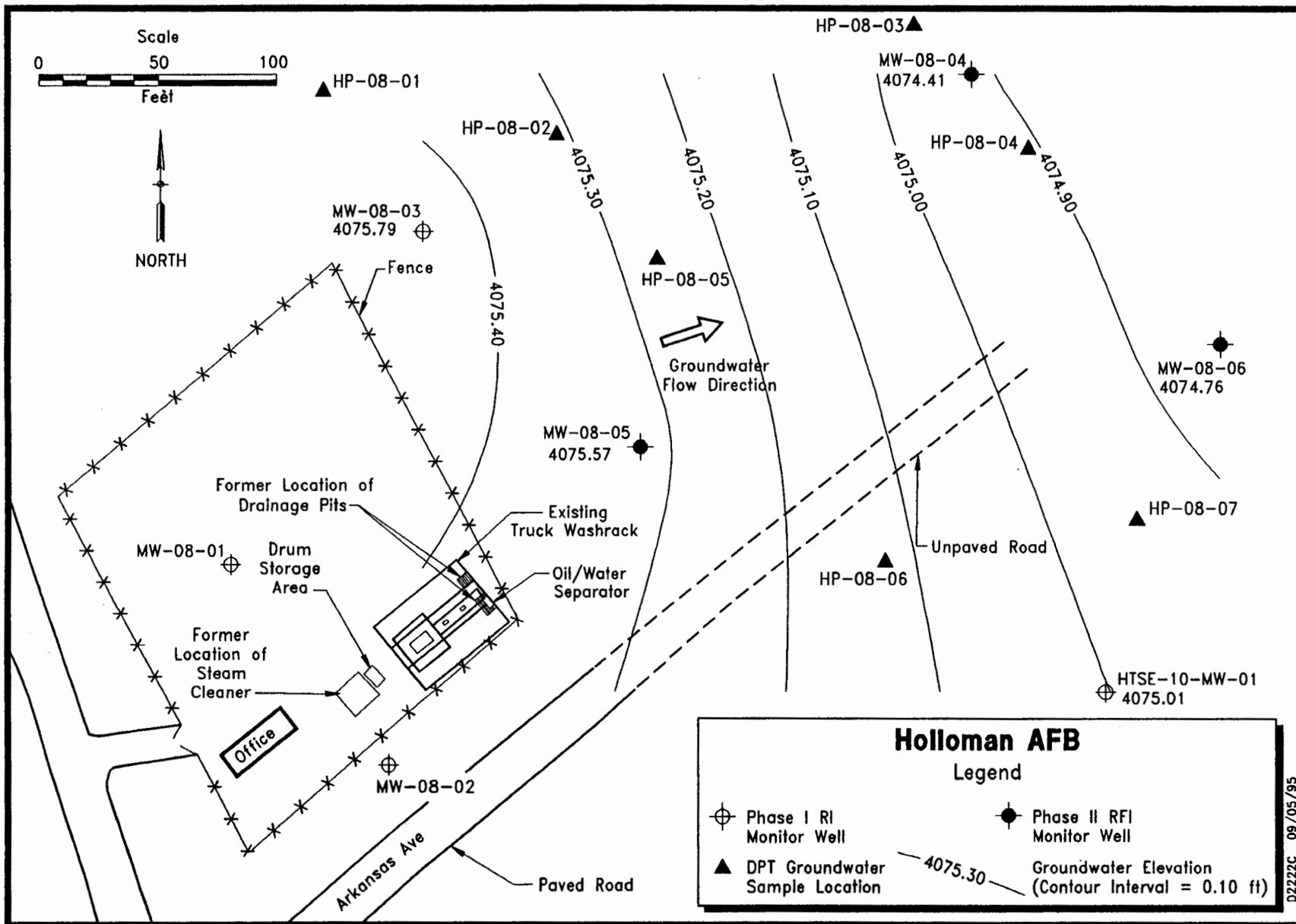


Figure 2-2 Groundwater Sample Locations at IRP Site SD-08

### Highlights of Community Participation

Copies of the following reports which contain information pertaining to the site are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992);
- *Corrective Measures Study Plan—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992);
- *Feasibility Study—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992); and
- *Phase II RCRA Facility Investigation Report, Table 1 Solid Waste Management Units, Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

Pesticide concentrations in the shallow soil at Site SD-08 pose an unacceptable occupational health risk. The selected remedial action to mitigate the risk is source containment by the placement of an impermeable cap over the affected soils. In addition, a chain-link fence surrounding the site will be erected to restrict access to the site. Once the remedial action has been implemented, the exposure pathways to the contaminated soil will be eliminated, as will the unacceptable human health risk. Annual inspection and maintenance of the cap will be conducted to ensure protection of human health and the environment.

In addition to the remedial action, a long-term groundwater monitoring program will be conducted at the site to ensure the effectiveness of the remedial action.

### Summary of Site Characteristics

The IRP records search conducted in 1983 indicated that pesticides may be present at the site as a result of past site activities. The presence and extent of pesticide contamination in the soil and groundwater beneath the site was delineated during following investigations: the Phase I RI, the predesign investigation for the feasibility study, and the Phase II RFI. A summary of the investigation is presented below.

### Soil

During the Phase I RI, six soil borings were drilled in the area around the washrack. Each soil boring was drilled to groundwater depth (8-12 ft). Samples were collected from the soil borings at 2.5-ft intervals. All soil samples were analyzed by a certified laboratory for VOCs, TPH, organochlorine pesticides, organophosphate pesticides, and chlorinated herbicides. Metals and organochlorine pesticides were detected in surface soils at the site. The highest concentrations (4,4-DDT, 4 mg/kg; 4,4-DDE, 5.6 mg/kg; heptachlor 0.49 mg/kg; and chlordane, 4 mg/kg) were detected in samples collected near the southeastern corner of the washrack and oil/water separator overflow area. Concentrations attenuated with depth, indicating that detected constituents are limited to the near surface. Lead (360 mg/kg) was detected at elevated concentrations in two soil borings.

Soil samples were collected from 14 soil borings during the predesign investigation to determine the extent of pesticide contamination at the site relative to the cleanup criteria established during the corrective measures study. A total of 26 samples were collected from the 14 soil borings. All samples were analyzed by a certified laboratory for cadmium, mercury, lead, and organochlorine pesticides. Results from the predesign investigation indicated that the area exceeding the established cleanup criteria is approximately 20,800 ft<sup>2</sup> and encompasses the southern half of the refuse yard. The depth of the affected soils was estimated to extend to 2 ft bgl except in the area north of the former steam cleaner where contamination extends to 4 ft bgl. A total volume of 1540 yd<sup>3</sup> of soil was estimated to exceed the cleanup criteria.

### Groundwater

Two groundwater monitor wells were installed during the Phase I RI. One round of samples was collected from these wells and an existing well. Samples were analyzed by a certified laboratory for VOCs, organochlorine pesticides, organophosphate pesticides, chlorinated herbicides, anions, and total dissolved solids.

Organochlorine pesticides and VOCs were detected in the groundwater. The highest concentrations of pesticides (heptachlor epoxide, 0.0005 mg/L) were detected in the downgradient well. The highest concentrations of BETX (10 mg/L) were detected in the upgradient well indicating that the BETX contamination is not related to the washrack.

Additional groundwater samples were collected from seven temporary standpipes, three new monitor wells, and two existing wells during the Phase II RFI. The samples were analyzed by a certified laboratory for organochlorine pesticides. Analytical results indicate that the highest concentrations of organochlorine pesticides (heptachlor epoxide 0.16 µg/L) were detected in monitor wells located immediately downgradient of the site. Monitor wells located further downgradient contained no concentrations above detection limits.

### Summary of Site Risks

A preliminary risk screen was conducted for Site SD-08 as part of the Phase I RI. The screen indicated that further assessment was necessary to quantify the exposure pathways and risks posed by pesticide contamination in the soil.

As part of the feasibility study, a risk assessment was conducted for the site to estimate the potential consequences to human health that could result if the soil contamination at this site is not remediated. The risk assessment consisted of four basic steps: 1) data analysis and selection of chemicals of concern; 2) identification of exposure pathways and receptors (i.e., skin, ingestion, or inhalation); 3) toxicity assessment or discussion of hazards and dose-response relationships associated with each contaminant; and 4) quantification of potential carcinogenic and noncarcinogenic risks. The results of the risk assessment are presented in the *Feasibility Study—Investigation, Study, and Recommendation for 29 Waste Sites* (HAFB,

1993), and a detailed description of the risk assessment procedures are contained in the *Risk Assessment Report for the Remedial Investigation--Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992).

### Human Health Risks

The risk assessment determined that the highest potential risks were posed to on-site workers; therefore, the human health risks evaluated for the site were based on potential occupational exposure to contaminated soil via dermal contact, inhalation, and ingestion.

Generally, total carcinogenic risk of  $10^{-6}$  for each contaminant is considered acceptable. This is equivalent to a one-in-one-million excess cancer risk from lifetime exposure to that chemical at that site. A cumulative total (sum of risk from all chemicals) must be at or below  $10^{-4}$  (or a one-in-ten-thousand excess cancer risk).

Several chemicals including chlordane ( $9 \times 10^{-6}$ ) and 4,4-DDT ( $4 \times 10^{-6}$ ) exceeded the acceptable individual carcinogenic risk. The average and reasonable maximum risks for the occupational exposure scenario were  $1 \times 10^{-5}$  and  $2 \times 10^{-5}$ , respectively. These values indicate that adverse human health effects may result from exposure to site contaminants.

For a noncarcinogenic risk to be acceptable, the hazard index may not exceed a value of 1. The hazard index is the ratio of the chemical intake to a reference dose (the acceptable dose). The noncarcinogenic risk for the average and reasonable maximum occupational exposure scenario were 20 and 30, respectively.

### Ecological Risks

Ecological risk for the site was not calculated because the site is primarily nonvegetated and is heavily trafficked and thus is not preferred habitat. In addition, the remedial action required to mitigate human health risk should also reduce any potential ecological

### Description of Alternatives

Because pesticide contamination at the site poses an occupational health risk, a remedial action is required. Remedial action objectives were developed for the site to ensure that the selected action adequately protects human health and the environment. The remedial action objectives and cleanup criteria for Site SD-08 are presented in the following table.

**Remedial Action Objectives for Site SD-08**

Objective	Contaminant	Cleanup Criteria (mg/kg)
Prevent dermal contact with contaminated soil above the cleanup criteria.	4,4-DDD	4.0
	4,4-DDE	3.3
Prevent inhalation of contaminated soil above the cleanup criteria.	4,4-DDT	1.1
	Cadmium	0.29
	Chlordane	0.14
	Lead	12
	Mercury	0.016

The established remedial action objectives were then used to evaluate the following seven remedial alternatives.

**No Action Alternative**—The no action alternative provides a baseline for comparison with the other alternatives. This alternative does not institute any type of remedial action to reduce the potential exposure, nor does it include institutional action, containment, excavation, treatment, or disposal technologies. The no action alternative relies entirely on natural processes for any reduction in the concentration of contaminants. The no action alternative is readily implementable and no capital or O&M costs are associated with this alternative.

**Land Use Restrictions Alternative**—This alternative institutes land use restrictions at the site to limit exposure to contaminants. The restrictions would prohibit certain uses of the land (e.g., residential use), as well as extraction of groundwater from the area. Under this alternative, work could not continue at the site. As with the no action alternative, this alternative depends entirely on natural processes for reduction in constituent concentrations.

The actions to be instituted in the land use restrictions alternative are readily implementable. Adequate materials and labor resources exist to meet the requirements of this alternative. The capital cost for this alternative is estimated to be \$16,000. The major component of the capital cost is the installation of fencing to enclose the area. The O&M cost associated with the alternative is minimal (e.g., fence repair), so the total cost for this alternative is \$16,000.

**Limited Asphalt Capping and Land Use Restrictions Alternative**—This alternative involves capping the area that has constituent concentrations exceeding the cleanup criteria with an asphalt cap to achieve the remedial action objectives. In addition, the actions instituted in the land-use restrictions alternative would be incorporated into this alternative. However, this alternative would allow work and storage of equipment to continue at the site.

This alternative is readily implementable; adequate equipment, materials, and labor are available to meet the requirements of the alternative. The capital cost for this alternative is estimated to be \$110,000. The major component of the capital cost is the asphalt capping. The asphalt cap would be approximately 13,050 ft<sup>2</sup>. The activities and services associated with maintaining the asphalt cap represent the major portion of the O&M costs. The period of performance is assumed to be 30 years. The annual O&M costs are estimated to be \$6700, yielding a total cost of \$210,000 for this alternative. Capping and fence installation could be completed within one year after design completion.

**Source Containment and Land Use Restrictions Alternative**—This alternative involves capping the entire refuse yard with an asphalt cap to achieve the remedial action objectives. In addition, the actions instituted in the land-use restrictions alternative would be incorporated into this alternative. However, this alternative would allow work and storage of equipment to continue at the site. The asphalt cap would be approximately 41,000 ft<sup>2</sup>.

This alternative is readily implementable; adequate equipment, materials, and labor are available to meet the requirements of the alternative. The capital cost for this alternative is estimated to be \$180,000. The major component of the capital cost is the emplacement of an 41,000 ft<sup>2</sup> asphalt cap. The activities and services associated with maintaining the asphalt cap represent the major portion of the O&M costs. The period of performance is assumed to be 30 years. The annual O&M costs are estimated to be \$7700, yielding a total cost of \$300,000 for this alternative. Capping and fence installation could be completed within one year after design completion.

**Excavation and Off-site Incineration (Hazardous Soil) Alternative**—This alternative would achieve the remedial action objectives by the removal and off-site incineration of soils with constituent concentrations above the cleanup criteria. This alternative is based on the assumption that the soil contains a hazardous waste. A front-end loader would be used to excavate approximately 1610 yd<sup>3</sup> of soil. The excavated soil would then be sent to a RCRA-permitted incinerator. The excavation would be backfilled with clean soil obtained from other areas of the Base. The major component of the capital cost is incineration of contaminated soils.

This alternative is considered to be implementable. The capital cost for this alternative is estimated to be \$4,100,000, most of which is due to the cost of excavation and incineration. No long-term O&M costs are associated with this alternative because constituents above the cleanup criteria would not remain on site. Remediation could be completed within one year after design completion.

**Excavation and Off-site Disposal (Hazardous Soil) Alternative**—This alternative would achieve the remedial action objectives by the removal and off-site disposal in a RCRA-permitted hazardous waste landfill of soils with constituents above the cleanup criteria. This alternative is based on the assumption that the soil contains a hazardous waste. A front-end loader would be used to excavate approximately 1610 yd<sup>3</sup> of soil. The excavated soil would then be sent to a RCRA-permitted hazardous waste landfill. The excavation would be backfilled with clean soil obtained from other areas of the Base. The major component of the capital cost is excavation, management, and disposal fees.

This alternative is considered to be implementable. The capital cost for this alternative is estimated to be \$1,200,000. No long-term O&M costs are associated with this alternative because constituents above the cleanup criteria would not remain on-site. Remediation could be completed within one year after design completion.

**Excavation and Off-site Disposal (Nonhazardous Soil) Alternative**—This alternative would achieve the remedial action objectives by the removal and off-site disposal in an industrial solid waste landfill of soils with constituent concentrations above the cleanup criteria. This alternative is based on the assumption that the soil does not contain a hazardous waste. A front-end loader would be used to excavate approximately 1610 yd<sup>3</sup> of soil. The excavated soil would then be sent to the nearest industrial solid waste landfill. The excavation would be backfilled with clean soil obtained from other areas of the Base.

This alternative is considered to be implementable. The capital cost for this alternative is estimated to be \$350,000. No long-term O&M costs are associated with this alternative because no constituents above the cleanup criteria concentration would remain on site. Remediation could be completed within one year after design completion. The major component of the capital cost is excavation, transportation and, disposal fees.

### Summary of Comparative Analysis of Alternatives

The initial review of the proposed alternatives during the feasibility study, two alternatives were selected to receive no further consideration because they would not meet the remedial action objectives. These alternatives consist of 1) land use restrictions and, 2) limited asphalt capping and land use restrictions.

The remaining three potential alternatives and the no action alternative were compared in a detailed analysis. The results of the comparative analysis are presented in Table 2-1.

## Selected Remedy

On the basis of the comparison of alternatives, the asphalt capping and land use restrictions alternative was selected during the feasibility study. However, upon review of the selected alternative, the U.S. EPA Region VI requested that the asphalt cap be enhanced to provide a greater degree of protection.

As a result of the agency's comments, Holloman AFB modified the asphalt cap design to conform to the following configurations:

- 2.5-in. asphalt cover;
- 6-in. prepared subbase;
- Geotextile filter fabric;
- Geonet drainage layer;
- 60-mil HDPE geomembrane; and
- 3-in. granular subgrade that is free of particles greater than 0.5-in. and angular fragments.

The cap will completely cover the area with constituent concentrations exceeding the cleanup criteria, approximately 41,000 ft<sup>2</sup>. The site will also be enclosed by a 6-ft-high chain-link fence, and land use restrictions will be used to restrict future land uses at the site (i.e., residential use or groundwater extraction). This remedy will allow work to continue at the site. Routine inspections and maintenance of the cap will be conducted. The total cost of the modified alternative is \$400,000 and the remedy could be implemented within six months after design completion. The selected remedy is presented in Figure 2-3.

## Statutory Determination

The selected remedial alternative meets the statutory requirements of CERCLA Section 121. A brief description of the statutory requirements and compliance with each evaluation criterion is provided in this section.

**Overall protection of human health and the environment**—The geomembrane liner and the asphalt cover will prevent dermal contact with the contaminated soils and will minimize the infiltration of precipitation and reduce the transport of contaminants to groundwater. With maintenance of the cover system, the proposed remedy will provide long-term protection to human health and the environment.

**Compliance with Applicable of Relevant and Appropriate Requirements (ARARs)**—The selected remedy complies with all ARARs presented in the feasibility study.

**Long-term effectiveness and permanence**—The selected remedy has a typical operational life in excess of 30 years. Construction quality assurance will include inspection and testing of installation and seaming procedures to meet the manufacturer's specifications. Maintenance of the asphalt cover, including the use of sealants and periodic asphalt overlays, will enhance the long-term performance of the entire cover system and extend the operating life of the liner. Punctures in the HDPE liner can be repaired with an extrusion-welded patch that will perform as well as the entire liner.

**Reduction of toxicity, mobility, or volume through treatment**—The proposed remedy does not reduce the toxicity or volume of the contaminants. However, the mobility of the contaminants is reduced, since the asphalt cover and HDPE liner prevent the infiltration of rain water to transport the contaminants to groundwater.

### Comparative Analysis of Alternatives for Site SD-08

Evaluation Criteria	No Action	Source Containment	Excavation/Incineration (for Hazardous Soil)	Excavation/Disposal (for Nonhazardous Soil)	Excavation/Disposal (for Hazardous Soil)
<b>OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT</b>					
Protection of Human Health	No reduction in risk. Would not prevent dermal contact with, or inhalation of, contaminated soil.	Could reduce the risk of dermal contact with, and inhalation of, contaminated soil.	Could significantly reduce the risk of dermal contact with, and inhalation of, contaminated soil.	Could significantly reduce the risk of dermal contact with, and inhalation of, contaminated soil.	Could significantly reduce the risk of dermal contact with, and inhalation of, contaminated soil.
Protection of Environment	Would not prevent impacts to the environment.	Should curtail migration of contaminants caused by erosion and by percolation of rainwater through the soil	Should protect the environment.	Should protect the environment.	Should protect the environment.
<b>COMPLIANCE WITH ARARS</b>					
Chemical-Specific ARARs	Could not meet ARARs or RAOs.	Would meet RAOs.	Could reduce contaminant concentrations in remaining soil to cleanup levels specified in RAOs.	Could reduce contaminant concentrations in remaining soil to cleanup levels specified in RAOs.	Could reduce contaminant concentrations in remaining soil to cleanup levels specified in RAOs.
Location-Specific ARARs	Not relevant. There are no location-specific ARARs.	Not relevant. There are no location-specific ARARs.	Not relevant. There are no location-specific ARARs.	Not relevant. There are no location-specific ARARs.	Not relevant. There are no location-specific ARARs.
Action-Specific ARARs	No action-specific ARARs were identified since this is the no-action alternative.	No action-specific ARARs were identified.	Should meet action-specific ARARs.	Should meet action-specific ARARs.	Should meet action-specific ARARs.
Other Criteria and Guidance	No other criteria.	No other criteria.	No other criteria.	No other criteria.	No other criteria.
<b>LONG-TERM EFFECTIVENESS AND PERMANENCE</b>					
Magnitude of Residual Risk	No reduction in risk.	Could reduce risk to acceptable levels.	Could reduce risk to acceptable levels.	Could reduce risk to acceptable levels.	Could reduce risk to acceptable levels.

**Comparative Analysis of Alternatives for Site SD-08  
(Continued)**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Source Containment</b>	<b>Excavation/Incineration (for Hazardous Soil)</b>	<b>Excavation/Disposal (for Nonhazardous Soil)</b>	<b>Excavation/Disposal (for Hazardous Soil)</b>
Adequacy and Reliability of Controls	No controls over existing contamination. No reliability.	Reliability of cap would be high if maintained.	Should be adequate and reliable since contaminated soils would be taken off site and treated.	Should be adequate and reliable since contaminated soils would be taken off site.	Should be adequate and reliable since contaminated soils would be taken off site and treated.
Need for 5-Year Review	Review would be required.	Review would be required to ensure that protection of human health was maintained.	Review would be required to ensure that remedial actions are successful.	Review would be required to ensure that remedial actions are successful.	Review would be required to ensure that remedial actions are successful.
<b>REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT</b>					
Treatment Process Used	None.	Asphalt capping.	Excavation by front-end loader. Incineration, stabilization, and disposal in RCRA facilities.	Excavation by front-end loader. Disposal in an industrial solid waste landfill.	Excavation by front-end loader. Stabilization for metals. Disposal in a RCRA hazardous waste landfill.
Amount of Hazardous Materials Destroyed or Treated	Would not treat or destroy any hazardous materials.	Would not treat or destroy any hazardous materials.	Excavated soil (approximately 1850 bulk cu yd) would be incinerated.	Would not treat or destroy any hazardous materials.	Excavated soil (approximately 1850 bulk cu. yd) would be stabilized.
Reduction of Toxicity, Mobility, or Volume	None.	Would not reduce the toxicity, mobility, or volume of the contaminants.	Could remove all soil with contaminant concentrations above cleanup levels. Contaminants in remaining soil should be below cleanup levels. Would reduce toxicity, mobility, and volume of contaminants.	Could remove all soil with contaminant concentrations above cleanup levels. Contaminants in remaining soil should be below cleanup levels. However, no net reduction of toxicity, mobility, or volume of contaminants.	Could remove all soil with contaminant concentrations above cleanup levels. Stabilization should decrease mobility of contaminants. Contaminants in remaining soil would be below cleanup levels. However, no net reduction of toxicity, or volume of contaminants.
Irreversibility of Treatment	Not applicable.	Not irreversible.	Irreversible.	Irreversible.	Irreversible.
Type and Quantity of Residuals Remaining After Treatment	No treatment residuals.	No treatment residuals. 1610 cu. yd of contaminated soils remain on site.	Approximately 1850 cu yd of ash remaining after incineration.	No treatment residuals. No remaining soil with contaminant concentrations above cleanup levels.	No treatment residuals. No remaining soil with contaminant concentrations above cleanup levels.
Statutory Preference for Treatment	Does not satisfy.	Does not satisfy.	Satisfies.	Does not satisfy.	Does not satisfy.

**Comparative Analysis of Alternatives for Site SD-08  
(Continued)**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Source Containment</b>	<b>Excavation/Incineration (for Hazardous Soil)</b>	<b>Excavation/Disposal (for Nonhazardous Soil)</b>	<b>Excavation/Disposal (for Hazardous Soil)</b>
Statutory Preference for On-Site Management of Waste	Does not satisfy.	Does not satisfy.	Does not satisfy.	Does not satisfy.	Does not satisfy.
<b>SHORT-TERM EFFECTIVENESS</b>					
Protection of Community	No additional risk to the community.	No additional risk to the community.	Slight risk during excavation and transportation of soils due to possible release of dust and semivolatle organics to the air.	Slight risk during excavation and transportation of soils due to possible release of dust and semivolatle organics to the air.	Slight risk during excavation and transportation of soils due to possible release of dust and semivolatle organics to the air.
Protection of Workers	No increased risk to workers.	Protection against dermal contact with, and inhalation of, contaminated soil during asphalt cap construction required.	Protection against dermal contact with, and inhalation of, contaminated soil during excavation and transportation activities required.	Protection against dermal contact with, and inhalation of, contaminated soil during excavation and transportation activities required.	Protection against dermal contact with, and inhalation of, contaminated soil during excavation and transportation activities required.
Environmental Impacts	None.	None.	Slight environmental impacts from excavation activities.	Slight environmental impacts from excavation activities.	Slight environmental impacts from excavation activities.
Time Requirements to Achieve RAOs	Indefinite.	Asphalt cap installed within 1 year. Could achieve RAOs within 1 year after design completion.	Excavation, incineration, stabilization, and disposal within 1 year. Could achieve RAOs within 1 year after design completion.	Excavation and disposal completed within 1 year. Could achieve RAOs within 1 year after design completion.	Excavation, stabilization, and disposal within 1 year. Could achieve RAOs within 1 year after design completion.
<b>IMPLEMENTABILITY</b>					
Ability to Construct and Operate	Not applicable.	Simple to construct.	Simple to implement.	Simple to implement.	Simple to implement.
Reliability of Technology	Not applicable.	Asphalt capping technology is reliable.	Excavation, incineration, stabilization, and disposal technologies are reliable.	Excavation and disposal technologies are reliable.	Excavation, stabilization, and disposal technologies are reliable.

**Comparative Analysis of Alternatives for Site SD-08  
(Continued)**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Source Containment</b>	<b>Excavation/Incineration (for Hazardous Soil)</b>	<b>Excavation/Disposal (for Nonhazardous Soil)</b>	<b>Excavation/Disposal (for Hazardous Soil)</b>
Ease of Carrying Out Additional Remedial Action If Necessary	No action would not significantly hinder implementation of future remedial actions.	Simple to extend asphalt cap. Only slight difficulties should be encountered if excavation were needed later.	Simple to extend remedial action.	Simple to extend remedial action.	Simple to extend remedial action.
Ability to Monitor Effectiveness of Remedial Actions	Base-wide groundwater monitoring program should allow adequate monitoring of site conditions.	Base-wide groundwater monitoring program should allow adequate monitoring of site conditions.	Confirmation sampling should be adequate to determine the effectiveness of remedial actions. Base-wide groundwater monitoring program should allow adequate monitoring of site conditions.	Confirmation sampling should be adequate to determine the effectiveness of remedial actions. Base-wide groundwater monitoring program should allow adequate monitoring of site conditions.	Confirmation sampling should be adequate to determine the effectiveness of remedial actions. Base-wide groundwater monitoring program should allow adequate monitoring of site conditions.
Ability to Obtain Approvals and Coordinate with Other Agencies	No approval necessary.	No approval necessary.	Approval required for incineration of soil at the off-site RCRA facility. No difficulties are expected.	Approval may be required for disposal at the off-site industrial solid waste landfill.	Approval required for disposal of soil at the off-site RCRA hazardous waste landfill.
Availability of TSD facilities	Not applicable.	Not applicable.	RCRA incineration facilities are readily available.	Disposal facilities are readily available.	Stabilization and disposal facilities are readily available.
Availability of Required Equipment and Specialists	Not applicable.	Equipment and specialists are available.	Equipment and specialists are available.	Equipment and specialists are available.	Equipment and specialists are available.
Availability of Required Materials and Services	Not applicable.	Materials and services are widely available.	Materials and services are widely available.	Materials and services are widely available.	Materials and services are widely available.
Availability of Prospective Technologies	No remedial technologies required.	Asphalt capping technology is readily available.	Excavation, incineration, stabilization, and land disposal technologies are available.	Excavation and land disposal technologies are readily available.	Excavation, stabilization, and land disposal technologies are readily available.
<b>COST</b>					
Capital Cost	\$0	\$230,000	\$4,500,000	\$441,000	\$1,600,000
Annual O&M Cost	\$0	\$8,300	\$0	\$0	\$0
Present Worth Cost	\$0	\$360,000	\$4,500,000	\$441,000	\$1,600,000

**Short-term effectiveness**—The proposed remedy could be completed within six months of design approval.

**Implementability**—Asphalt capping with a geomembrane liner is a well-known construction technique and should not be difficult to implement.

**Cost**—The selected remedy is estimated to cost \$400,000.

**Regulatory acceptance**—The U.S. EPA Region VI and the NMED have reviewed and approved the proposed remedy.

**Community acceptance**—Holloman AFB held a public hearing on August 26, 1993, at which time no one from the community expressed any concerns regarding Holloman AFB's recommendation.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the USACE (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

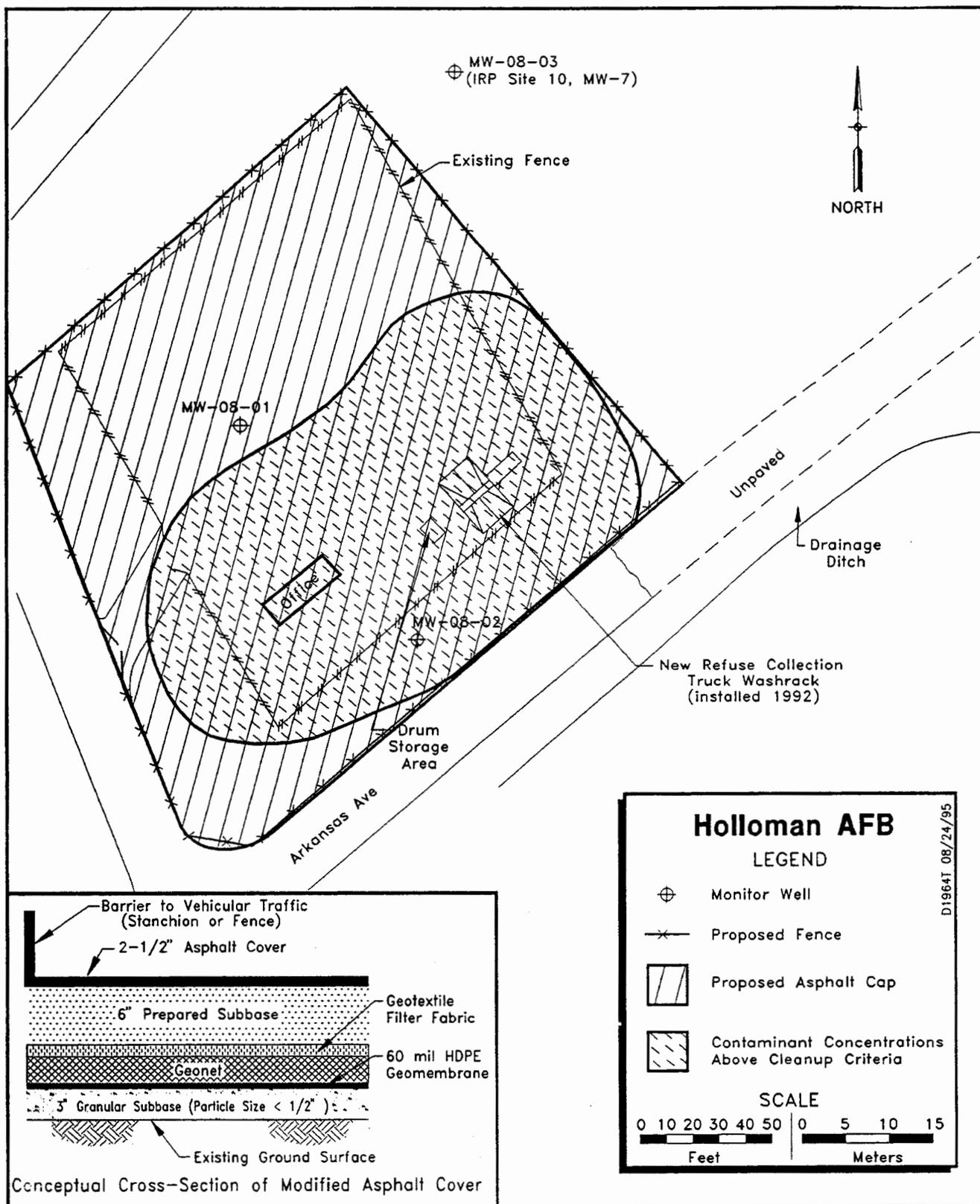


Figure 2-3 Map of Selected Remedial Action at Site SD-08

**Declaration**

**Statutory Preference for Treatment as a  
Principal Element is not Applicable  
and a Five-Year Review is not Required**

**Site Name and Location**

IRP Site SS-12  
JP-4 Fuel Line Spill Site  
Holloman Air Force Base, New Mexico

**Statement of Basis and Purpose**

This decision document presents the selected remedial action for the referenced site, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

**Description of the Selected Remedy: No Action**

Information presented in the administrative record for the site investigations conducted for the site indicates that no action is necessary to protect human health and the environment at the site.

**Declaration Statement**

The remedial investigation and risk assessment conducted for the site indicate that conditions at the site do not require further action to ensure the protection of human health and the environment. Because no hazardous substances will remain on site above health-based levels, a five-year review is not necessary.

If new evidence suggesting the need for further action becomes available, the site closeout decision may be changed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.

  
\_\_\_\_\_  
Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Bruce Carlson  
Brigadier General, USAF Commander

  
\_\_\_\_\_  
Date

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## Decision Summary

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### Site Name and Location

IRP Site SS-12, the JP-4 Fuel Line Spill Site, is located directly east of the Main Base housing area near the Standard Transpipe JP-4 pipeline which is the primary pipeline serving the POL Storage Yard. The topography of the site is generally flat, and the ground is sparsely covered with vegetation. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consist of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow direction is controlled by southwest-trending arroyos and flows to the southwest, following the Dillard Draw drainage system (see Figure 1-2). At Site SS-12, groundwater occurs approximately 3 ft bgl, and flows east-southeast toward Dillard Draw.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

In 1975, approximately 2000 gal. of JP-4 were spilled at the site as a result of a rupture in the fuel line. Much of the fuel reportedly collected in a pit and was pumped into a tank truck shortly after the spill. The date, quantity, and location of the fuel spill could not be confirmed during the literature search. In early 1992, fuel was allegedly encountered while installing a storm sewer line approximately 250 ft west (upgradient) of the pipeline.

Site SS-12 was identified as a potential contaminant source during an IRP records search conducted in 1983. As a result, the site was included in a Phase I RI completed in 1993. Results of the investigation indicated that low levels of petroleum contamination were detected in the soil and groundwater beneath the site. After reviewing the Phase I RI report, the NMED requested additional soil data to confirm the concentrations of petroleum constituents in the soil. To meet this request, Holloman AFB collected additional samples from the site during a Phase II RI in 1994.

The site was identified as AOC-K in the RCRA facility assessment conducted in 1987. However, this AOC was not listed in the Hazardous and Solid Waste Amendments permit issued to Holloman AFB by U.S. EPA Region VI; therefore, the site is not part of the RCRA corrective action program at Holloman AFB.

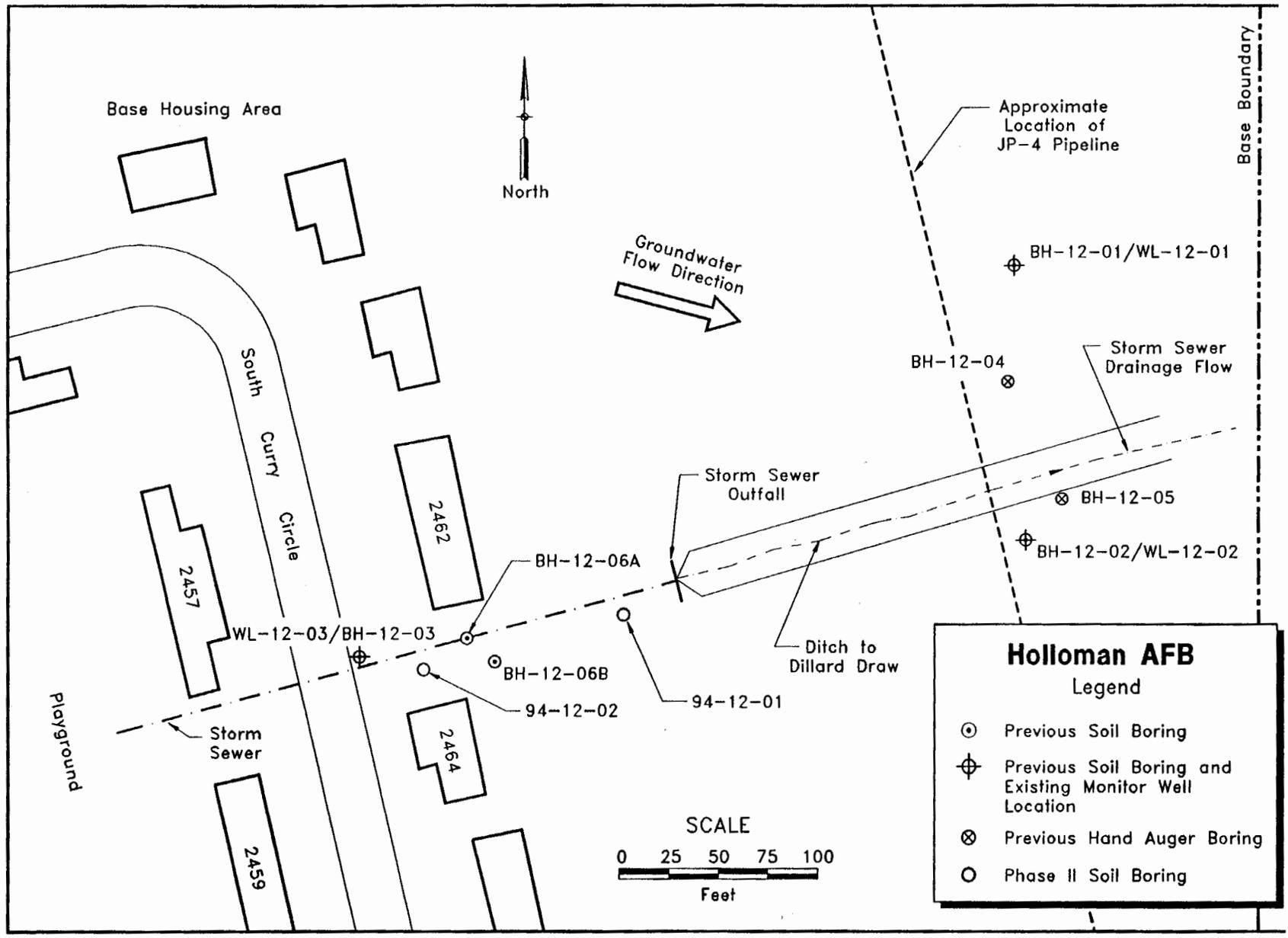


Figure 2-1. Map of IRP Site SS-12

### **Highlights of Community Participation**

Copies of the *Preliminary Assessment and Site Investigation Report—Investigation of Four Waste Sites* (HAFB, 1993) which contains information pertaining to the site is available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries.

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### **Scope and Role of the Response Action**

Results from the Phase I RI, risk assessment, and Phase II RI conducted at the site indicate that no action is necessary to protect human health and the environment under CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan.

### **Summary of Site Characteristics**

The IRP record search for Site SS-12 indicated that petroleum constituents related to the fuel spill may be present at the site. To determine the presence or absence of contamination at Site SS-12, Holloman AFB conducted a Phase I RI in 1993. The investigation focused on two principal areas of possible contamination: the segment of the JP-4 pipeline that ruptured in 1975 and the area of the alleged discovery of fuel product during storm sewer installation. A Phase II RI was conducted by Holloman AFB in 1994 to confirm the concentrations of petroleum constituents. A summary of these investigations is presented below.

#### **Soil**

During the Phase I RI, six soil samples were collected and submitted to a certified laboratory for analysis of diesel, kerosene, and VOCs. Kerosene was detected in one shallow soil sample (0 to 2 ft bgl) located adjacent to the JP-4 pipeline along a ditch that receives runoff from the storm sewer. The concentration of kerosene was 35 µg/g, which is not indicative of a release from the JP-4 pipeline. The concentration of kerosene is significantly less than the NMED cleanup criteria for fuel-contaminated soil established for Holloman AFB.

Six soil samples were also collected during the Phase II investigation. No VOCs were detected above the detection limit, and the highest concentration of TRPH detected was 590 mg/kg.

**Groundwater**

Three of the soil borings were completed as monitor wells during the Phase I RI. Benzene (0.49 µg/L), ethylbenzene (3.6 µg/L), and toluene (5.3 µg/L) were detected in some of the groundwater samples. No diesel fuel was detected in the samples.

**Summary of Site Risks**

A qualitative risk assessment, conducted as part of the Phase I RI, identified potential receptors but concluded that the exposure pathways were incomplete because of the low levels of contamination detected at the site. Therefore, the site does not pose an unacceptable risk to human health or the environment.

**Description of the Selected Alternative**

The Phase I RI, risk assessment, and Phase II RI conducted for Site SS-12 indicate that no action is necessary to protect human health or the environment.

**Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

## Declaration

### Statutory Preference for Treatment as a Principal Element is Applicable and a Five-Year Review is Required

#### Site Name and Location

IRP Site OT-14 (RCRA SWMU 197)  
Former Entomology Shop  
Holloman Air Force Base, New Mexico

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the referenced site chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the selected remedy.

#### Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this decision document, may present a current or potential threat to public health, welfare, or the environment.

#### Description of the Selected Remedy

The selected remedy will reduce the risks associated with exposure to pesticide-contaminated soils at the site and will reduce the potential for infiltration of contaminants to groundwater. The major components of the selected remedy include the following:

- Placement of an impermeable cap over the affected soils;
- Installation of stanchions to restrict access to the site; and
- Annual inspection and maintenance of the cap.

#### Declaration Statement

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical and satisfies the statutory preferences for remedies that employ treatment that reduces toxicity mobility or volume as a principal element.

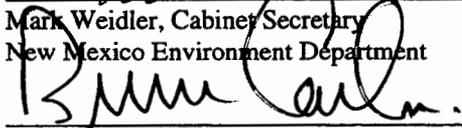
Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.



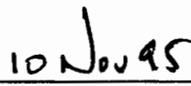
Mark Weidler, Cabinet Secretary  
New Mexico Environment Department



Date



Bruce Carlson  
Brigadier General, USAF Commander



Date

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## Decision Summary

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### Site Name, Location and Description

IRP Site OT-14, the Former Entomology Shop, occupies approximately two-tenths acre in the northwestern corner of the Civil Engineering yard in the Main Base Area. The site is bound on the northwest by the Civil Engineering yard fence, on the southeast by Building 66, and by a smaller building to the northeast. The topography of the site is generally flat and there is no vegetation on site. The site is unpaved but is surrounded by paved areas. Figure 1-1 shows the location of Site OT-14 on Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow is controlled by southwest-trending arroyos and is to the southwest, following the Dillard Draw surficial drainage system (see Figure 1-2). Groundwater occurs at 5 ft bgl at the site and flows to the south/southwest toward Dillard Draw.

The unconfined aquifer beneath the site and the remainder of Holloman AFB exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on the NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

The Former Entomology Shop was in operation from 1968 until 1977. Building 67 served as the Entomology Shop Office and the area adjacent to Building 66 as the mixing and storage area. During these years, the open area was used to store drums of concentrated pesticides and as a wash and rinse area for pesticide application equipment. Pesticides commonly stored and mixed at the site included 4,4'-DDT and chlordane. Diesel fuel was routinely used to solubilize the pesticides.

In July 1977, soil samples were collected from the site indicated the presence of several pesticides. In an effort to stabilize this contamination, the top 6 to 8 in. of soil were treated with lime and powdered charcoal and subsequently tilled.

The site was identified as a potential contaminant source during an IRP records search conducted in 1983. As a result, the site was included in a Phase I RI conducted in 1991. Results of the investigation indicated that pesticide contamination was present in the shallow soils beneath the site and that a remedial action was necessary to protect human health and the environment. The results also indicated that additional soil samples were necessary to fully define the lateral extent of pesticide contamination. After reviewing the Phase I RI report, the U.S. EPA Region VI concurred with the recommendations. A corrective measure study and a feasibility study were conducted in 1992 and 1993, respectively, to recommend a remedial action. A Phase II RFI was conducted in 1994 to fully delineate the lateral extent of soil contamination.

The site is also listed as SWMU 197 on the Hazardous and Solid Waste Amendments permit issued to Holloman AFB by the U.S. EPA Region VI in 1987. This SWMU was investigated during a RCRA facility assessment conducted in 1992. All site investigation and studies performed for the site have met the requirements of the IRP and RCRA program.

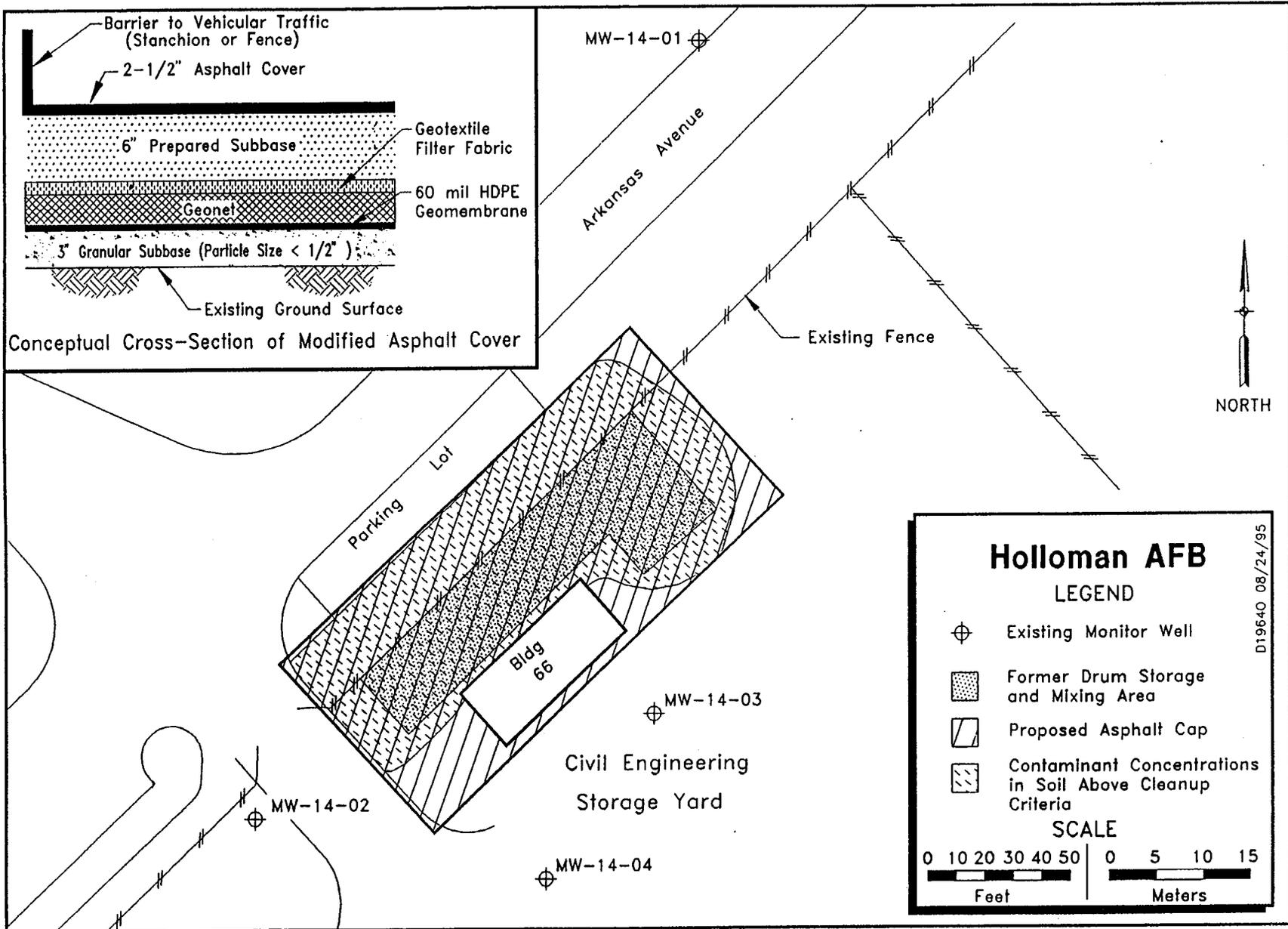


Figure 2-1. Map of Site OT-14

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## Highlights of Community Participation

Copies of the following reports, which contain information pertaining to the site, are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (Holloman AFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (Holloman AFB, 1992b); and
- *Phase II RCRA Facility Investigation, Table 1 Solid Waste Management Units, Draft Final* (Holloman AFB, 1995).

Public Restoration Advisory Board meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. At least one week prior to the meeting date, public announcements of the meeting are published in the local newspaper and/or area radio stations. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

## Scope and Role of the Response Action

Pesticide concentrations in the shallow soil at Site OT-14 pose an unacceptable occupational health risk. The selected remedial action to mitigate the risk is source containment by the placement of an impermeable cap over the affected soils. In addition, stanchions will be erected to restrict access to the site. Once the remedial action has been implemented, exposure pathways to the site will be eliminated, as will the unacceptable human health risk. Annual inspection and maintenance of the cap will be conducted to ensure protection of human health and the environment.

## Summary of Site Characteristics

The initial investigation conducted at the site in 1977 indicated that pesticides were present in on-site soils. The presence and extent of pesticide contamination in the soil at the site was delineated during the Phase I RI conducted in 1991, and the Phase II RFI conducted in 1994. A summary of the field investigations is presented below.

### Soil

During the Phase I RI, five soil borings were drilled in the former drum storage and mixing area. Each soil boring was drilled to groundwater depth (5 ft). Samples were collected from 0-2 and 2-4 ft. All soil samples were analyzed by a certified laboratory for VOCs, TPH, organochlorine pesticides, organophosphate pesticides, and chlorinated herbicides. Laboratory results showed the highest concentrations of constituents (chlordane, 34 mg/kg; heptachlor, 0.77 mg/kg; gamma-BHC, 2.8 mg/kg; aldrin, 1.7 mg/kg; 4,4'-DDD, 10 mg/kg; 4,4'-DDE, 6.1 mg/kg; and 4,4'-DDT, 36 mg/kg) to be at or near the surface along the fence where drums were

stored and where most of the mixing occurred. Constituent concentrations attenuated with depth, indicating that detected constituents are limited to the near-surface soils.

Soil samples were collected from 12 soil borings during the 1994 field investigation to determine the extent of pesticide contamination at the site relative to the cleanup criteria established in a corrective measure study conducted for the site in 1992. All samples were collected from 0 to 2 ft. Of the 12 soil samples, 8 were collected from within the area estimated during the feasibility study to exceed cleanup criteria, and 4 were found to contain one or more pesticides in excess of the cleanup criteria. Chlordane exceeded the cleanup criteria in all four of these samples, with concentrations ranging from 0.23 to 26 mg/kg. Aldrin, heptachlor, 4,4'-DDT, and 4,4'-DDE all exceeded the cleanup criteria in a sample from the central portion of the site. None of the four samples collected from outside the estimated area were found to contain any pesticides in excess of the cleanup criteria. Analytical results from this field investigation indicate that pesticide contamination is concentrated in a band that runs approximately east to west in the central portion of the site.

### **Groundwater**

Four groundwater monitor wells were installed at the site during the Phase I RI. One round of samples was collected during the investigation and analyzed by a certified laboratory for VOCs, organochlorine pesticides, organophosphate pesticides, chlorinated herbicides, anions, and total dissolved solids. No organochlorine pesticides were detected in the samples, indicating that groundwater beneath the site has not been adversely impacted by site activities.

### **Summary of Site Risks**

A risk assessment was conducted to estimate the potential consequences to human health and the environment that could result if the soil contamination at this site is not remediated. The risk assessment consisted of four basic steps: 1) data analysis and selection of chemicals of concern; 2) identification of exposure pathways and receptors (i.e., skin, ingestion, or inhalation); 3) toxicity assessment or discussion of hazards and dose-response relationships associated with each contaminant; and 4) quantification of potential carcinogenic and noncarcinogenic risks. A detailed description of the risk assessment is contained in the *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992).

### **Human Health Risks**

The human health risks evaluated for the site were based on potential residential and occupational exposure to contaminated soil via dermal contact, inhalation, and ingestion.

Generally, total carcinogenic risk of  $10^{-6}$  or lower for each contaminant is considered acceptable. This is equivalent to a one-in-a-million excess cancer risk from lifetime exposure to that chemical at that site. A cumulative total (sum of risk from all chemicals) must be at or below  $10^{-4}$  (or a one-in-ten-thousand excess cancer risk). The carcinogenic risk for the average occupational exposure scenario was  $1 \times 10^{-4}$ . The carcinogenic risks estimated for the residential exposure scenarios ranged from  $7 \times 10^{-10}$  to  $2 \times 10^{-9}$  indicating that carcinogenic effects are not likely.

The carcinogenic risk estimated for the occupational exposure scenario was  $1 \times 10^{-4}$ , which indicates that an unacceptable human health risk may be posed by the site.

For a noncarcinogenic risk to be acceptable, the sum of the hazard index may not exceed a value of 1. The hazard index is the ratio of the chemical intake to a reference dose (the acceptable dose). However, the noncarcinogenic risk for the average occupational exposure scenario was 3. This value indicates that adverse human health effects may result from exposure to site contaminants.

**Ecological Risks**

Ecological risk was evaluated for the site using an ecological quotient. The ecological quotient estimates the potential ecological risks associated with the contaminants of concern primarily through the ingestion of soil and/or contaminated plants. An ecological quotient of less than 1 indicates a low probability of adverse effects, a value between 1 and 10 indicates that is a possibility of adverse ecological effects.

The ecological quotient for the site is 1.3 for the black-tailed rabbit, selected as the indicator species. However, since the site is not currently vegetated and experiences heavy traffic during the day, it is unlikely that jackrabbits will ingest vegetation.

**Description of Alternatives**

Remedial action objectives were developed for the site during a corrective measures study to ensure that the selected action adequately protects human health and the environment. The remedial action objectives and cleanup criteria for Site OT-14 are presented in the following table.

**Remedial Action Objectives for Site OT-14**

Objective	Contaminant	Cleanup Criteria (mg/kg)
Prevent dermal contact with pesticide concentrations that are in excess of the cleanup criteria in the soil.	4,4'-DDD	1.5
	4,4'-DDE	1.0
	4,4'-DDT	1.3
	Aldrin	0.01
	Chlordane	0.2
	Heptachlor	0.1
	gamma-BHC	0.7

The established remedial action objectives were then used during a feasibility study to evaluate the following seven remedial alternatives.

**No Action Alternative**—The no action alternative provides a baseline for comparison of the other alternatives. This alternative does not institute any type of remedial action to reduce the potential exposure, nor does it include institutional action, containment, excavation, treatment, or disposal technologies. The no action alternative relies entirely on natural processes for any reduction in the concentration of contaminants. The no action alternative is readily implementable and no capital or O&M costs are associated with this alternative.

**Land Use Restrictions Alternative**—This alternative institutes land use restrictions to limit exposure to constituents at the site. The restrictions would prohibit certain uses of the land (e.g., residential use), as well as extraction of groundwater from the area. Under this alternative, work could not continue at the site. As with the no action alternative, this alternative depends entirely on natural processes for reduction in constituent concentrations.

The actions to be instituted in the land use restrictions alternative are readily implementable. Adequate materials and labor resources exist to meet the requirements of this alternative. The capital cost for this alternative is estimated to be \$15,000. The major capital cost is the installation of additional fencing to enclose the area. The O&M cost associated with the alternative is minimal (e.g., fence repair), so the total cost for this alternative is \$15,000.

**Asphalt Capping and Land Use Restrictions Alternative**—This alternative involves capping the area with constituent concentrations exceeding the cleanup criteria with an asphalt cap to meet the remedial action objectives. In addition, actions instituted in the land restrictions alternative would be incorporated into this alternative. However, this alternative would allow work and storage of equipment to continue at the site.

This alternative is readily implementable; adequate equipment, materials, and labor are available to meet the requirements of the alternative. The capital cost for this alternative is estimated to be \$100,000. The major component of the capital cost is the asphalt capping. The asphalt cap would be approximately 12,000 ft<sup>2</sup>. The activities and services associated with maintaining the asphalt cap represent the major portion of the O&M costs. The period of performance is assumed to be 30 years. The annual O&M costs are estimated to be \$6700, yielding a total cost of \$200,000 for this alternative. Capping and fence installation could be completed within one year after design completion.

**Excavation, On-site Thermal Treatment, and On-site Disposal Alternative**—This alternative involves excavation and on-site treatment of soils with constituent concentrations above the cleanup criteria to meet the remedial action objectives. A front-end loader would be used to excavate approximately 740 yd<sup>3</sup> of soil. The excavated soil would then be treated in a portable infrared thermal desorption unit located at the Base. The treated soil would be used to backfill the excavation.

This alternative is considered to be implementable. However, infrared thermal desorption technology has not been widely tested in full-scale remediation projects. The capital cost for this alternative is estimated to be \$580,000, most of which is due to the cost of operating the thermal desorption system. No O&M costs are associated with this alternative because no constituents with concentrations above the cleanup criteria would remain on site. Remediation could be completed within one year after design completion.

**Excavation, On-site Thermal Treatment, and Off-site Disposal Alternative**—This alternative involves excavation and on-site treatment of soils with constituent concentrations above the cleanup criteria to meet the remedial action objectives. A front-end loader would be used to excavate approximately 740 yd<sup>3</sup> of soil. The excavated soil would then be treated in a portable infrared thermal desorption unit located at the Base. The treated soil would be disposed of in an off-site industrial solid waste landfill. The excavation would be backfilled with clean soil obtained from other areas of the Base.

This alternative is considered to be implementable. However, infrared thermal desorption technology has not been widely tested in full-scale remediation projects. The capital cost for this alternative is estimated to be \$630,000, most of which is due to the cost of operating the thermal desorption system. No long-term O&M costs are associated with this alternative because no constituents with concentrations above the cleanup criteria would remain on site. Remediation could be completed within one year after design completion.

**Excavation and Off-site Incineration Alternative**—This alternative involves excavation and off-site incineration of soils with constituent concentrations above the cleanup criteria to meet the remedial action objectives. This alternative is based on the assumption that the soil contains a hazardous waste. A front-end loader would be used to excavate approximately 740 yd<sup>3</sup> of soil. The excavated soil would then be sent to a RCRA-permitted incinerator. The excavation would be backfilled with clean soil obtained from other areas of the Base.

This alternative is considered to be implementable. The capital cost for this alternative is estimated to be \$1,800,000, most of which is due to the cost of excavation and incineration. No long-term O&M costs are associated with this alternative because no constituents above the cleanup criteria concentration would remain on site. Remediation could be completed within one year after design completion.

**Excavation and Off-site Disposal Alternative**—This alternative involves excavation and off-site disposal in a RCRA hazardous waste landfill of soils with constituent concentrations above the cleanup criteria to meet the remedial action objectives. This alternative is based on the assumption that the soil contains a hazardous waste. A front-end loader would be used to excavate approximately 740 yd<sup>3</sup> of soil. The excavated soil would then be sent to a RCRA hazardous waste landfill. The excavation would be backfilled with clean soil obtained from other areas of the Base.

This alternative is considered to be implementable. The capital cost for this alternative is estimated to be \$610,000, most of which is due to the cost of landfilling the soil. No long-term O&M costs are associated with this alternative because no constituents above the cleanup criteria concentration would remain on site. Remediation could be completed within one year after design completion.

### **Summary of Comparative Analysis of Alternatives**

During the initial review of the proposed alternatives during the feasibility study, three alternatives were selected to receive no further consideration: 1) the land use restrictions alternative; 2) the excavation, on-site thermal treatment, and on-site disposal alternative; and 3) the excavation, on-site thermal treatment, and off-site disposal alternative. The land use restrictions alternative did not meet the remedial action objectives and the other two alternatives relied on a technology that has yet to be proved widely effective.

The remaining three alternatives and the no action alternative are compared in a detailed analysis. The results of this comparative analysis are presented in Table 2-1.

### **Selected Remedy**

On the basis of the comparison of alternatives, the asphalt capping and land use restrictions alternative was selected during the feasibility study. However, upon review of the selected alternative, the U.S. EPA Region VI requested that the asphalt cap be enhanced to provide a greater degree of protection.

**Table 2-1  
Comparative Analysis of Alternatives for Site OT-14**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Asphalt Capping and Land Use Restrictions Alternative</b>	<b>Excavation/Incineration</b>	<b>Excavation and Off-Site Disposal Alternative</b>
<b>OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT</b>				
Protection of Human Health	No reduction in risk. Would not prevent dermal contact with contaminated soil.	Could reduce the risk of dermal contact with contaminated soil.	Could significantly reduce the risk of dermal contact with contaminated soil.	Could significantly reduce the risk of dermal contact with contaminated soil.
Protection of Environment	Would not prevent impacts to the environment.	Could curtail migration of contaminants caused by erosion and by percolation of rainwater through the soil.	Should protect the environment.	Should protect the environment.
<b>COMPLIANCE WITH ARARS</b>				
Chemical-Specific ARARS	Would not meet ARARS or RAO.	Would meet RAO.	Could reduce contaminant concentrations in remaining soil to cleanup levels specified in RAO.	Could reduce contaminant concentrations in remaining soil to cleanup levels specified in RAO.
Location-Specific ARARS	Not relevant. There are no location-specific ARARS.	Not relevant. There are no location-specific ARARS.	Not relevant. There are no location-specific ARARS.	Not relevant. There are no location-specific ARARS.
Action-Specific ARARS	No action-specific ARARS were identified since this is the no-action alternative.	No action-specific ARARS were identified.	Should meet action-specific ARARS.	Should meet action-specific ARARS.
Other Criteria and Guidance	No other criteria.	No other criteria.	No other criteria.	No other criteria.
<b>LONG-TERM EFFECTIVENESS AND PERMANENCE</b>				
Magnitude of Residual Risk	No reduction in risk.	Could reduce risk to acceptable levels.	Could reduce risk to acceptable levels.	Could reduce risk to acceptable levels.
Adequacy and Reliability of Controls	No controls over existing contamination. No reliability.	Reliability of cap would be high if maintained.	Should be adequate and reliable, since contaminated soils would be taken off site.	Should be adequate and reliable, since contaminated soils would be taken off site.
Need for 5-Year Review	Review would be required.	Review would be required to ensure that protection of human health was maintained.	Review would be required to ensure that remedial actions are successful.	Review would be required to ensure that remedial actions are successful.

**Table 2-1  
(Continued)**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Asphalt Capping and Land Use Restrictions Alternative</b>	<b>Excavation/Incineration</b>	<b>Excavation and Off-Site Disposal Alternative</b>
<b>REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT</b>				
Treatment Process Used	None.	Asphalt capping.	Excavation by front-end loader. Incineration, stabilization, and disposal in RCRA facilities.	Excavation by front-end loader. Disposal in a RCRA hazardous waste landfill.
Amount of Hazardous Materials Destroyed or Treated	Would not treat or destroy any hazardous materials.	Would not treat or destroy any hazardous materials.	Excavated soil (approximately 850 bulk cu yd) would be incinerated.	Would not treat or destroy any hazardous materials.
Reduction of Toxicity, Mobility, or Volume	None.	Would not reduce the toxicity, mobility, or volume of the contaminants.	Would reduce toxicity, mobility, and volume of contaminants in excavated soil. Remaining contaminants should be within acceptable levels.	Could remove all soil with contaminant concentrations above acceptable levels. Remaining contaminants should be within acceptable levels.
Irreversibility of Treatment	Not applicable.	Action not irreversible.	Irreversible.	Irreversible.
Type and Quantity of Residuals Remaining After Treatment	None. No treatment residuals.	No treatment residuals. 740 cu yd of contaminated soils remain.	Approximately 850 cu yd of ash remaining after incineration. No remaining soil with contaminant concentrations above cleanup levels.	No treatment residuals. No remaining soil with contaminant concentrations above cleanup levels.
Statutory Preference for Treatment	Does not satisfy.	Does not satisfy.	Does not satisfy.	Does not satisfy.
Statutory Preference for On-Site Management of Waste	Does not satisfy.	Does not satisfy.	Satisfies.	Does not satisfy.

**Table 2-1  
(Continued)**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Asphalt Capping and Land Use Restrictions Alternative</b>	<b>Excavation/Incineration</b>	<b>Excavation and Off-Site Disposal Alternative</b>
<b>SHORT-TERM EFFECTIVENESS</b>				
Protection of Community	No change in risk to community.	No substantial risks to community.	Slight risk during excavation and transportation of soils from possible release of dust and semi-volatile organics to the air.	Slight risk during excavation and transportation of soils from possible release of dust and semivolatile organics to the air.
Protection of Workers	No significant risk to workers.	Protection against dermal contact with contaminated soil required during asphalt cap construction.	Protection against dermal contact with contaminated soil required during excavation and transportation activities.	Protection against dermal contact with contaminated soil required during excavation and transportation activities.
Environmental Impacts	No significant environmental impact from taking no action.	Should have minimal environmental impacts.	Should have minimal environmental impacts.	Should have minimal environmental impacts.
Time Requirements to Achieve RAOs	Indefinite.	Asphalt cap installed within 1 year. Could achieve RAO within 1 year after design completion.	Excavation and incineration of soil completed within 1 year. Could achieve RAO within 1 year after design completion.	Excavation and disposal of soil completed within 1 year. Could achieve RAO within 1 year after design completion.
<b>IMPLEMENTABILITY</b>				
Ability to Construct and Operate Reliability of Technology	No construction or operation. No technology used.	Simple to construct and operate. Asphalt capping technology is reliable.	Simple to implement. Excavation and disposal technologies are reliable.	Simple to implement. Excavation and disposal technologies are reliable.
Ease of Carrying Out Additional Remedial Action If Necessary	No action should not significantly hinder implementation of future remedial actions.	Simple to extend asphalt cap. Only slight difficulties would be encountered if excavation were needed later.	Simple to extend remedial action.	Simple to extend remedial action.
Ability to Monitor Effectiveness of Remedial Actions	No monitoring provided.	No monitoring provided.	Confirmation sampling should be adequate to determine the effectiveness of remedial actions.	Confirmation sampling should be adequate to determine the effectiveness of remedial actions.
Ability to Obtain Approvals and Coordinate with Other Agencies	No approval necessary.	No approval necessary.	Approval may be required for incineration at the off-site RCRA facility.	Approval required for disposal of soil at the off-site RCRA hazardous waste landfill.

**Table 2-1  
(Continued)**

<b>Evaluation Criteria</b>	<b>No Action</b>	<b>Asphalt Capping and Land Use Restrictions Alternative</b>	<b>Excavation/Incineration</b>	<b>Excavation and Off-Site Disposal Alternative</b>
Availability of TSD facilities	Not applicable.	Not applicable.	Incineration and disposal facilities are readily available.	Disposal facilities are readily available.
Availability of Required Equipment and Specialists	Not applicable.	Equipment and specialists are available.	Equipment and specialists are available.	Equipment and specialists are available.
Availability of Required Materials and Services	Not applicable.	Materials and services are widely available.	Materials and services are widely available.	Materials and services are widely available.
Availability of Prospective Technologies	Not applicable.	Asphalt capping technology is readily available.	Excavation, incineration, and land disposal technologies are readily available.	Excavation and land disposal technologies are readily available.
<b>COST</b>				
Capital Cost	\$0	\$100,000	\$1,800,000	\$610,000
Annual O&M Cost	\$0	\$6,700	\$0	\$0
Present Worth Cost	\$0	\$200,000	\$1,800,000	\$610,000

As a result of the agency's comments, Holloman AFB modified the asphalt cap design to conform to the following configurations:

- 2.5-in. asphalt cover
- 6-in. prepared subbase
- Geotextile filter fabric
- Geonet drainage layer
- 60-mil HDPE geomembrane
- 3-in. granular subgrade that is free of particles greater than 0.5-in. and angular fragments

The cap will cover the area with constituent concentrations exceeding the cleanup criteria, approximately 12,000 ft<sup>2</sup>. Stanchions, instead of fencing, will limit access to the site; land use restrictions will be used to restrict future land uses at the site (i.e., residential use or groundwater extraction). This remedy will allow light work (no heavy vehicles) to be performed at the site. Routine inspections and maintenance of the cap will be conducted. The total cost of the modified alternative is \$400,000 and the remedy should be completed within six months after design completion. The selected remedy is presented in Figure 2-2.

### **Statutory Determination**

The selected remedial alternative meets the statutory requirements of CERCLA Section 121. A brief description of the statutory requirements and compliance with each evaluation criterion is provided in this section.

**Overall protection of human health and the environment**—The geomembrane liner will prevent the infiltration of precipitation and reduce the transport of contaminants into the subsurface aquifer. The geomembrane liner and the asphalt cover will prevent dermal contact with contaminated soils. With maintenance of the cover system and barriers to vehicular traffic, the proposed remedy will provide long-term protection to human health and the environment.

**Compliance with Applicable of Relevant and Appropriate Requirements (ARARs)**—The selected remedy complies with all ARARs presented in the feasibility study.

**Long-term effectiveness and permanence**—The selected remedy has a typical operational life in excess of 30 years. Construction quality assurance will include inspection and testing of installation and seaming procedures to meet the manufacturer's specifications. Maintenance of the asphalt cover, including the use of sealants and periodic asphalt overlays, will enhance the long-term performance of the entire cover system and extend the operating life of the liner. Punctures in the HDPE liner can be repaired with an extrusion-welded patch that will perform as well as the entire liner.

**Reduction of toxicity, mobility, or volume through treatment**—The proposed remedy does not reduce the toxicity or volume of the contaminants. However, the mobility of the contaminants is reduced, since the asphalt cover and HDPE liner prevent the infiltration of rain water to transport the contaminants to the groundwater.

**Short-term effectiveness**—The proposed remedy could be completed within six months of design approval.

**Implementability**—Asphalt capping with a geomembrane liner is a well-known construction technique and should not be difficult to implement.

**Cost**—The selected remedy is estimated to cost \$400,000.

**Regulatory acceptance**—The U.S. EPA Region VI and the NMED have reviewed and accepted the proposed remedy.

**Community acceptance**—Holloman AFB held semiannual public meetings to discuss proposed actions at IRP sites on the Base. No comments were received during these meetings pertaining to the site.

**Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

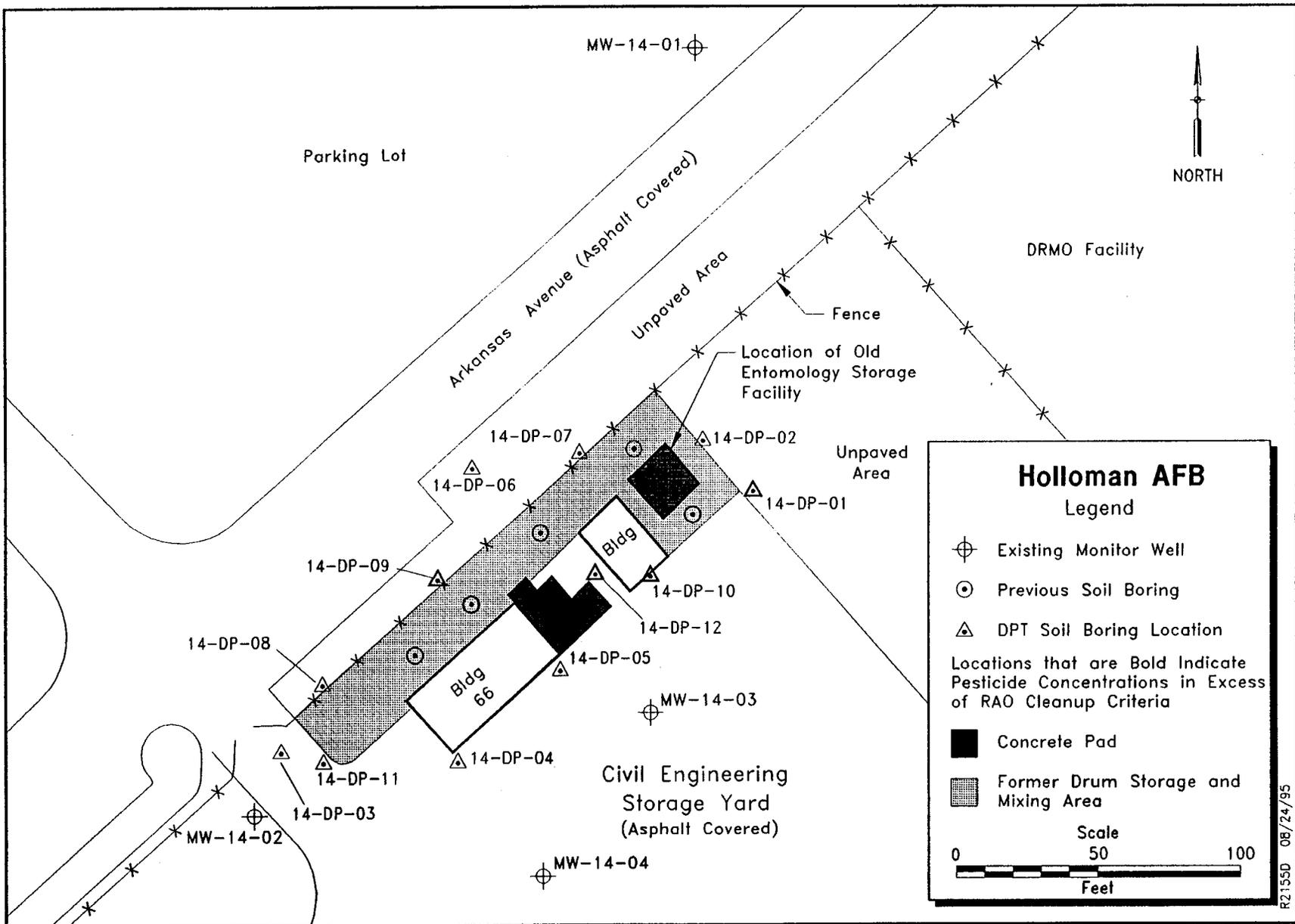


Figure 2-2. Map of Selected Remedial Action at Site OT-14

## Declaration

### Statutory Preference for Treatment as a Principal Element is not Applicable and a Five-Year Review is Required

#### Site Name and Location

IRP Site OT-20 (RCRA SWMU 113A)  
Wastewater Treatment Plant Grit Burial Site  
Holloman Air Force Base, New Mexico

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the referenced site, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

#### Description of the Selected Remedy: No Action

The remedial investigation and risk assessment conducted for the site indicated that, although waste will remain on site, no action is necessary to protect human health and the environment. As part of the no action remedy, a long-term groundwater monitoring program has been initiated.

#### Declaration Statement

The RI and risk assessment conducted for the site indicated that conditions at the site do not require further action to ensure the protection of human health and the environment. Because waste will remain on site, a review will be conducted within five years after commencement of the selected remedy to ensure that the remedy continues to provide adequate protection of human health and the environment.

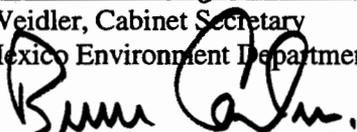
If new evidence becomes available and suggests the need for further action, the site closeout decision may be reversed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.



Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

Date

9/29/95



Bruce Carlson  
Brigadier General, USAF Commander

Date

3 Nov 95

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## Decision Summary

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### Site Name and Location

IRP Site OT-20, the Wastewater Treatment Plant Grit Burial site, is located southeast of the wastewater treatment plant along the northeast corner of the sewage lagoon system in the southern portion of the Base. The ground surface of the site is void of vegetation, with a few greasewood shrubs marking the southernmost boundary. The topography of the site dips moderately to the west toward Pond B of the sewage lagoon system. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow direction is controlled by southwest-trending arroyos and is to the southwest, following the Dillard Draw drainage system (see Figure 1-2). At Site OT-20, groundwater occurs at approximately 7 ft bgl, and flows to the southeast, toward the sewage lagoon system. Local groundwater flow direction is controlled by the southwest-trending arroyos.

The unconfined aquifer beneath Holloman AFB exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

From the beginning of Base operations until approximately 1984, settled solids from the grit chambers at the headworks of the Base's wastewater treatment plant were buried at Site OT-20. The site consists of three pits that are approximately 2 to 3 ft wide, 2 to 8 ft deep, and 20 ft long. The site covers a total area of approximately 7200 ft<sup>2</sup>. Disturbed soils indicate the general location of the site.

Site OT-20 was identified as a potential contaminant source during an IRP records search conducted in 1983. As a result, the site was included in a Phase I RI completed in 1992. Results of the investigation indicated that no action was necessary to protect human health and the environment. After reviewing the Phase I RI report, the U.S. EPA requested that the waste be removed from the site. Because the waste does not pose an unacceptable risk to human health or the environment, Holloman AFB determined that removing the waste would increase the potential exposure risks to workers during excavation, transportation and disposal. Therefore, Holloman AFB recommended no further action at the site and long-term monitoring of groundwater in conjunction with the sewage lagoons. Both the U.S. EPA Region VI and the NMED concurred with the recommendation in an approved letter, received by Holloman AFB in January 1994, for the *RCRA Phase II Facility Investigation Workplan* (HAFB, 1993).

The site is listed as SWMU 113A on the Hazardous and Solid Waste Amendment permit issued to Holloman AFB by U.S. EPA Region VI. The site was included in a RCRA facility assessment in 1987. The investigation performed for the site met the requirements of the IRP and RCRA program.

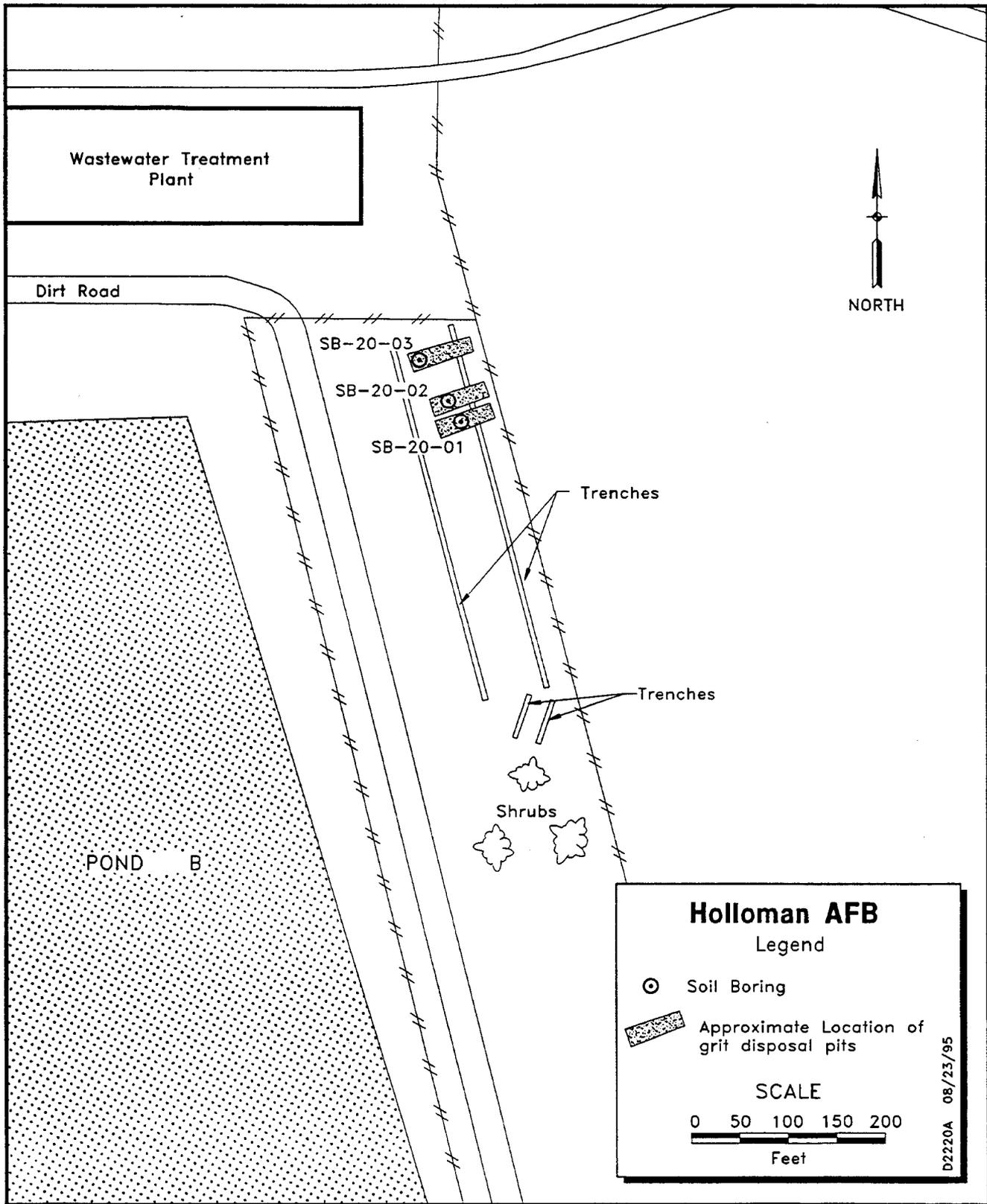


Figure 2-1. Map of IRP Site OT-20

### Highlights of Community Participation

Copies of the following reports, which contain information pertaining to the site, are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a); and
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. At least one week prior to the meeting date, announcements of the meeting are published in the local newspaper and/or area radio stations. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

The Phase I RI and the risk assessment conducted for the site indicate that no action is necessary at Site OT-20 to protect human health and the environment under CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. However, because waste will remain on site, groundwater quality will be monitored in conjunction with the sewage lagoon's long-term monitoring plan.

### Summary of Site Characteristics

The IRP record search, conducted in 1993, indicated that contamination as a result of past waste disposal practices may be present at the site. The presence of contamination at Site OT-20 was confirmed during a Phase I RI conducted in 1991. A summary of the field investigation is presented below.

#### Soil

Two 300-ft long trenches were excavated parallel to the east bank of Pond B to locate the grit burial pits. Waste was encountered in three locations during trenching activities. A soil boring was drilled through each of the three waste pits. Samples were collected from both the waste materials and the soil beneath the pits. The samples were analyzed by a certified laboratory for VOCs, total metals, and pesticides.

Metals were detected above established background levels in the waste samples, but not in the underlying soil sample. The highest concentration (cadmium, 2.5 mg/kg; chromium, 20 mg/kg; lead, 48 mg/kg; mercury, 2.5 mg/kg) were detected in the two southernmost waste pits.

PCBs, organochlorine pesticides, and dicamba were detected in the waste samples, but not in the underlying soil samples. The highest concentrations (heptachlor epoxide, 5 mg/kg; PCB-1254, 4.8 mg/kg) were detected in the northern waste pit.

VOCs were not measured above detection limits, or were measured in associated laboratory blank samples, making their presence in the field samples uncertain.

### Groundwater

Because of the proximity of the site to the sewage lagoons and the similarity of potential contaminants at each site, groundwater quality effects cannot be distinguished between the sites. Therefore, groundwater quality has been and will continue to be monitored as part of the extensive well network installed for the sewage lagoons.

### Summary of Site Risks

As part of the Phase I RI, a risk assessment was conducted to estimate the potential consequences to human health and the environment that could result if contamination at the site is not remediated. The risk assessment consisted of four basic steps: 1) data analysis and selection of chemicals of concern; 2) identification of exposure pathways and receptors (i.e., dermal contact, ingestion, or inhalation); 3) toxicity assessment of each contaminant; and 4) quantification of potential carcinogenic, noncarcinogenic, and ecological risks. A detailed description of the risk assessment is contained in the *Risk Assessment Report for the Remedial Investigation- Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b).

### Human Health Risks

Generally, a total carcinogenic risk of less than  $1 \times 10^{-6}$  for each chemical contaminant is considered acceptable. This is equivalent to a one-in-a-million excess cancer risk from exposure to that chemical at the site. In addition, the combined carcinogenic risk from all chemical contaminants must be equal to or less than  $1 \times 10^{-4}$ , a one-in-one-ten-thousand excess cancer risk. Noncarcinogenic risk is assessed on the basis of a hazard index, which is the ratio of potential daily chemical intake to an acceptable dose. For a noncarcinogenic risk to be acceptable, the hazard index should not exceed a value of 1.0.

The human health risks evaluated for Site OT-20 were based on the possible exposure of on-Base residents, on-Base workers, and future off-Base residents to contaminants in the soil by inhalation. The carcinogenic and noncarcinogenic risk values estimated for Site OT-20 indicate that adverse human effects are unlikely. The values are presented in Table 2-1.

Table 2-1. Summary of Estimated Human Health Risks

Exposure Scenario	Estimated Carcinogenic Risk		Estimated Hazard Indices
	Average	Reasonable Maximum	Average
Current On-Base Resident	$2 \times 10^{-10}$	--	0.002
Future Off-Base Resident	$9 \times 10^{-11}$	$3 \times 10^{-10}$	$7 \times 10^{-7}$
Current On-Base Occupational Worker	$1 \times 10^{-8}$	$1 \times 10^{-8}$	0.04

### Ecological Risk

Ecological risk was evaluated using an ecological quotient, which estimates the potential ecological risks associated with contaminants of concern, primarily through ingestion of soil and/or contaminated plants by

native biota. An ecological quotient of less than 1 indicates a low probability of adverse effects; a value between 1 and 10 indicates that there is a possibility of adverse ecological effects.

At Site OT-20, the total ecological quotient for black-tailed jack rabbits, selected as the indicator species, ingesting plants from the site was determined to be 4.0. The plan ingestion exposure pathway was chosen to conservatively estimate future risk if the site were revegetated. However, since the site is not vegetated nor represents a suitable habitat for vegetation, remediation of the site on the basis of a hypothetical future risk was not recommended.

### **Description of the Selected Alternative**

The Phase I RI and associated risk assessment conducted for Site OT-20 indicate that no action is necessary to protect human health or the environment. Although waste will remain on site, Holloman AFB determined that removing the waste would increase the potential exposure risks to workers during excavation, transportation, and disposal.

To ensure that the selected remedy continues to be protective of human health and the environment, groundwater quality will be monitored as part of the long-term monitoring program conducted for the adjacent sewage lagoons. Details of the monitoring program are presented in the *Long-Term Monitoring Plan for the Sewage Lagoons* (HAFB, 1995).

In an approved letter for the *RCRA Phase II Facility Investigation Workplan*, both the U.S. EPA Region IV and the NMED concurred with the selected remedial action.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

## Declaration

### Statutory Preference for Treatment as a Principal Element is not Applicable and a Five-Year Review is Required

#### Site Names and Location

IRP Sites DP-30 & SD-33 (RCRA SWMU 113B)  
Grease Trap Disposal Pits Site and  
Cooking Grease Disposal Pits Site  
Holloman Air Force Base, New Mexico

#### Statement of Basis and Purpose

This decision document presents the selected remedial action for the referenced sites, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

#### Description of the Selected Remedy: No Action

The remedial investigation and risk assessment conducted for the sites indicated that, although waste will remain on site, no action is necessary to protect human health or the environment. As part of the no action remedy, a long-term groundwater monitoring program will be initiated.

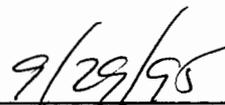
#### Declaration Statement

The remedial investigation and risk assessment conducted for the sites indicate that conditions at the site do not require further action to ensure the protection of human health and the environment. Because waste will remain on site, a review will be conducted within five years after commencement of the selected remedy to ensure that the remedy continues to provide adequate protection of human health and the environment.

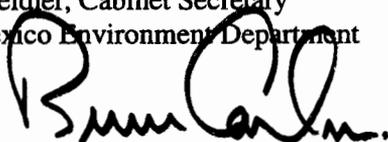
If new evidence becomes available and suggests the need for further action, the site closeout decision may be reversed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.



Mark Weidler, Cabinet Secretary  
New Mexico Environment Department



Date



Bruce Carlson  
Brigadier General, USAF Commander



Date

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## Decision Summary

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### Site Name and Location

IRP Sites DP-30 and SD-33, the Grease Trap Disposal Pits site and the Cooking Grease Disposal Pits site, respectively, are located between the skeet range and the fire training area, north of Sabre Road in the eastern portion of the Base. The topography of the site is generally flat, and the ground is sparsely covered with vegetation. Five of the former pits are identifiable by linear depressions in the surface soil. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consist of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow direction is controlled by southwest-trending arroyos, and is to the southwest, following the Dillard Draw drainage system (see Figure 1-2). Groundwater occurs at approximately 20 ft bgl at the sites, and flows southeast toward Dillard Draw.

The unconfined aquifer beneath Holloman AFB exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

Since 1972, wastes from grease traps, oil/water separators, grit from the wastewater treatment plant, oil/water separator sludge, possible uncontrolled dumpings, and occasional sewage from the Primate Research Institute were disposed of at the site.

Sites DP-30 and SD-33 were identified as potential contaminant sources during an IRP records search conducted in 1983. As a result, the sites were included in a Phase I RI conducted in 1991. Results of the investigation indicated that contamination was present in the soils and groundwater beneath the site. On the basis of a preliminary risk-based screen, a feasibility study was recommended to quantitatively evaluate risks posed by the site and recommend further action. Holloman AFB evaluated site-specific exposure pathways and determined that the waste does not pose an unacceptable risk to human health and the environment. Holloman AFB also determined that removing the waste would increase the potential exposure risks to workers during excavation, transportation, and disposal. Therefore, Holloman AFB recommended no further action at the site, and long-term monitoring of groundwater beneath the site. Both U.S. EPA Region VI and the NMED concurred with the recommendation in an approval letter for the *RCRA Phase II Facility Investigation Work Plan* (Holloman AFB, 1993) received by Holloman AFB in January 1994.

These sites also are listed as SWMU 113B on the Hazardous and Solid Waste Amendments permit issued to Holloman AFB by U.S. EPA Region VI. The site was included in a RCRA facilities assessment in 1987. The investigation performed for the sites met the requirements of the IRP and RCRA program.

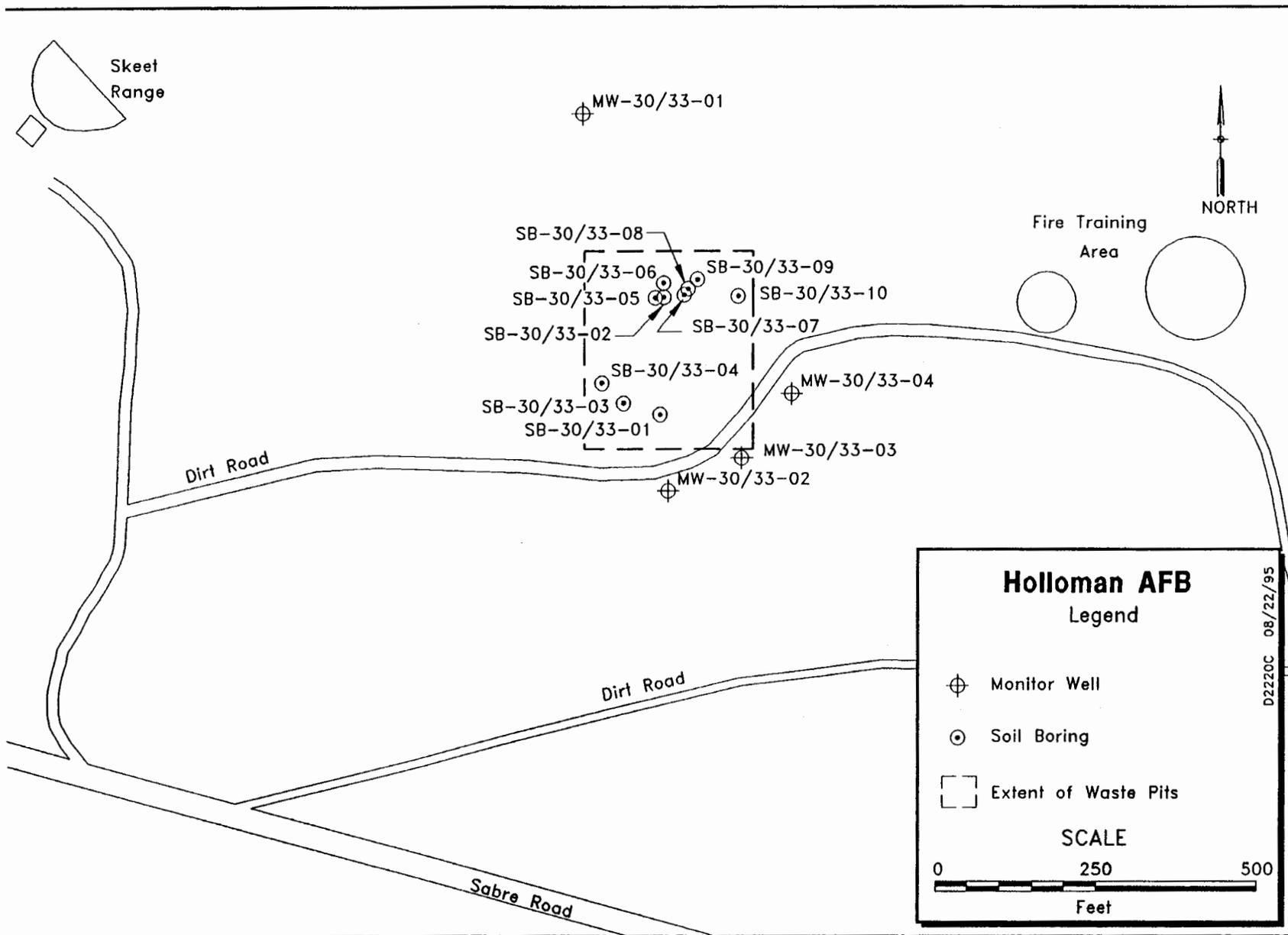


Figure 2-1. Map of IRP Sites DP-30 and SD-33

### Highlights of Community Participation

Copies of the following reports which contain information pertaining to the site are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b); and
- *Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. At least one week prior to the meeting date, announcements of the meeting are published in the local newspaper and/or area radio stations. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

The Phase I RI and the risk assessment conducted for the site indicate that no action is necessary at Sites DP-30 or SD-33 to protect human health and the environment under CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. However, because waste will remain on site, a long-term monitoring program will be conducted at the site to ensure the effectiveness of the selected remedy.

### Summary of Site Characteristics

The IRP records search, conducted in 1983, indicated that contamination, as a result of past waste disposal practices, may be present at the site. The presence of contamination was confirmed during a Phase I RI conducted in 1991. A summary of the field investigation is presented below.

#### Soil

Eleven trenches were excavated in the area of the five observable depressions. A total of 10 pits were discovered during trenching activities. The pits are approximately 40 to 50 ft long and between 2 and 3 ft wide.

One soil boring was drilled in each pit. The depths of the former pits at the soil boring locations varied between 2.5 and 9 ft bgl. The pits are covered by 1 to 3 ft of silty sands and sandy silts.

Soil and wastes samples were collected from the 10 soil borings. The samples were analyzed for VOCs, total metals, pesticides, PCBs, oil and grease, gross alpha/beta radioactivity, SVOCs, and chlorinated herbicides. A number of analytes were detected at concentrations above RCRA action levels in the waste samples.

Beryllium was detected at concentrations above action levels in both soil and waste samples, but all concentrations were less than established background concentrations for Holloman AFB. Lead was detected at concentrations above background level in waste samples (ranging from 68 to 2400 mg/kg) and one soil sample (59 mg/kg). PCB-1254 was detected above action levels in waste samples (ranging from 1.2 to 19 mg/kg) and at significantly lower concentrations (0.13 and 0.21 mg/kg) in two underlying soil samples. Two, organochlorine pesticides, dieldrin, and heptachlor epoxide were detected at elevated concentrations in waste samples (dieldrin, 0.14 mg/kg; and heptachlor epoxide, 0.94 mg/kg).

### **Groundwater**

Four groundwater monitor wells were installed at the site. Groundwater samples were collected and analyzed by a certified laboratory for VOCs, total metals, pesticides, PCBs, oil and grease, gross alpha/beta radionuclides, chlorinated herbicides, anions, and total dissolved solids. Concentrations of beryllium, lead, and selenium exceeded background levels established for Holloman AFB.

### **Summary of Site Risks**

A preliminary risk screen was conducted at Sites DP-30 & SD-30 as part of the Phase I RI. The screen indicated that further assessment was necessary to quantify site-specific pathways and risks posed by the waste. Holloman AFB determined that because the sites are located in a remote area and the waste is buried beneath the surface, no complete exposure pathways are present. Therefore, the site does not pose an unacceptable risk to human health or the environment. The U.S. EPA Region VI and the NMED concurred with the conclusion in an approval letter for the *RCRA Phase II Facility Investigation Work Plan* (Holloman AFB, 1993) received by Holloman AFB in January 1994.

### **Description of the Selected Alternative**

The Phase I RI and associated risk assessment conducted for Sites DP-30 and SD-33 indicate that, although waste will remain on site, no action is necessary to protect human health and the environment. Holloman AFB determined that removing the waste would increase the potential exposure risks to workers during excavation, transportation, and disposal.

As part of the no action remedy and site closeout procedures, a long-term groundwater monitoring program will be initiated to ensure that the remedy continues to provide adequate protection of human health and environment. A long-term monitoring program will be submitted by Holloman AFB for approval by the NMED.

In an approval letter for the *RCRA Phase II Facility Investigation Work Plan* (Holloman AFB, 1993), both the U.S. EPA Region VI and the NMED concurred with the selected remedy.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

**Declaration**

**Statutory Preference for Treatment as a  
Principal Element is not Applicable  
and a Five-Year Review is not Required**

**Site Name and Location**

IRP Site OT-35 (RCRA SWMU PRI-2 and PRI-5)  
Spent Solvent Disposal Area  
Holloman Air Force Base, New Mexico

**Statement of Basis and Purpose**

This decision document presents the selected remedial action for the referenced site, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

**Description of the Selected Remedy: No Action**

The site investigation conducted for the site indicates that no action is necessary to protect human health and the environment.

**Declaration Statement**

The site investigation conducted for the site indicates that conditions at the site do not require further action to ensure the protection of human health and the environment. Because no hazardous substances were detected at the site, a five-year review is not necessary.

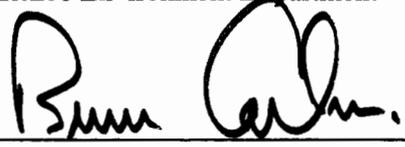
If new evidence suggesting the need for further action becomes available, the site closeout decision may be reversed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.



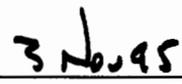
Mark Weidler, Cabinet Secretary  
New Mexico Environment Department



Date



Bruce Carlson  
Brigadier General, USAF Commander



Date

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## Decision Summary

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### Site Name and Location

IRP Site OT-35, the Spent Solvent Disposal Area, is located approximately 2 miles north of the Main Base near the Primate Research Lab at Holloman AFB, New Mexico. Site topography is relatively flat, and the area is sparsely vegetated. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soils at the site consist primarily of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. The regional groundwater flow direction is controlled by southwest-trending arroyos and is to the southwest, following the Dillard Draw surficial drainage system (Figure 1-2). At Site OT-35, groundwater occurs at approximately 35 to 40 ft below ground surface and flows to the northwest toward Rita's Draw.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

The Spent Solvent Disposal Area is located near the Primate Research Lab. Spent solvents containing radioactive tracers (carbon-14 and tritium) had reportedly been disposed of on the ground at the site intermittently since the 1950s.

Site OT-35 was identified as a potential contaminant source during an IRP records search conducted in 1983. The site was included in site investigation completed in 1993. Results of the investigation indicated that no action was necessary to protect human health and the environment. No remedial actions have been conducted at the site.

The site was identified as SWMUs PRI-02 and PRI-05 in the RCRA facility assessment conducted in 1987. However, these SWMUs were not listed in the Hazardous and Solid Waste Amendments permit issued to Holloman AFB by U.S. EPA Region VI and are not part of the RCRA corrective action program at Holloman AFB.

### Highlights of Community Participation

Copies of the *Preliminary Assessment and Site Investigation Report—Investigation of Four Waste Sites* (Holloman AFB, 1993), which contains information pertaining to the site, is available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries.

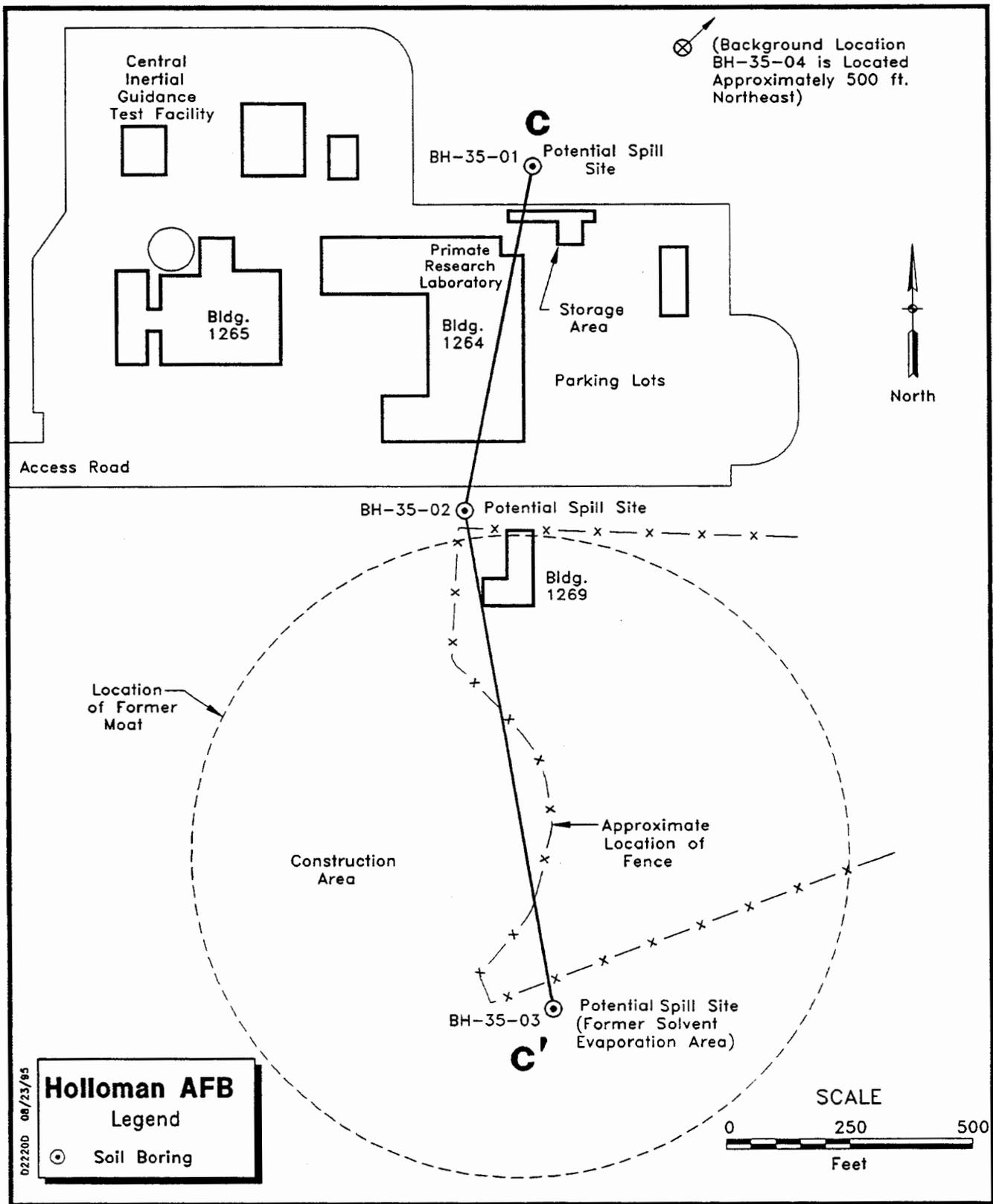


Figure 2-1. Map of IRP Site OT-35

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### **Scope and Role of the Response Action**

The site investigation conducted for the site indicates that no action is necessary at Site OT-35 to protect human health and the environment under CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan.

### **Summary of Site Characteristics**

The IRP record search for Site OT-35 indicated that small amounts of solvents and radioactive metals may be present in the soil at the site. To determine the presence or absence of contamination at Site OT-35, Holloman AFB conducted a site investigation in 1993. The investigation focused on three principal areas of possible contamination:

- An area of stressed vegetation behind Building 1264;
- A slightly vegetated area near Building 1269 where stained soils were observed; and
- An area several hundred yards south of Building 1269 that was identified as the former solvent evaporation area where spent solvents were set out in evaporation pans for disposal.

Four borings were drilled to groundwater and a total of six soil samples were collected at the site. The samples were submitted to a certified laboratory for analyses of VOCs and gross alpha, beta, and gamma radioactivity. A background sample was collected approximately 500 ft northeast of the site and analyzed for alpha, beta, and gamma radioactivity to establish background levels.

Detected radioactivity levels were comparable to levels in the background sample. Radioactivity levels were also compared with *Waste Acceptance Criteria for Radioactive Solid Waste Disposal at SWSA-6* (Oak Ridge National Laboratory [ORNL], 1993). None of the radioactivity levels in the soils samples exceeded ORNL criteria. No VOCs were detected in any of the soil samples.

### **Summary of Site Risks**

Contamination was not detected during the site investigation; therefore, the site does not pose unacceptable risk to human health or the environment.

### **Description of the Selected Alternative**

The site investigation conducted for Site OT-35 indicated that no action is necessary to protect human health or the environment.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

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## Declaration

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**Statutory Preference for Treatment as a  
Principal Element is not Applicable  
and a Five-Year Review is not Required**

**Site Name and Location**

IRP Site SS-39 (RCRA SWMUs 165, 177, 179, and 181)  
Missile Fuel Spill Site  
Holloman Air Force Base, New Mexico

**Statement of Basis and Purpose**

This decision document presents the selected remedial action for the referenced site, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

**Description of the Selected Remedy: No Action**

Site investigations and a risk assessment conducted for the site indicated that no action is necessary to protect human health and the environment.

**Declaration Statement**

The remedial investigation and associated risk assessments conducted for the site indicate that conditions at the site do not require action to ensure the protection of human health and the environment. Because no hazardous substances will remain on site above health-based levels, a five-year review is not necessary.

If new evidence suggesting the need for further action becomes available, the site closeout decision may be changed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.

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Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

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Date

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Bruce Carlson  
Brigadier General, USAF Commander

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Date

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## Decision Summary

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### Site Name and Location

IRP Site SS-39, the Fuel Missile Spill Area, is located approximately 3.5 miles northwest of the Main Base near Building 1176. The site consists of the two outfall areas from the oxidizer and propellant spill drain pipes, south of the Test Track and the drainage troughs and sumps located near Building 1176. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

The site occupies an area of approximately 15 acres. Site topography is relatively flat, and the area is sparsely vegetated. Soils at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow at Holloman AFB is to the southwest and is controlled by southwest-trending arroyos (see Figure 1-2). At Site SS-39, groundwater occurs approximately 20 ft bgl and flows to the south toward the Lost River drainage basin.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. Based on the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered non-potable.

### Site History and Enforcement Activities

Facilities at Site SS-39 were involved in fueling, detanking, and routine maintenance of test sleds. Fueling activities for test sleds were completed on the track at the Alpha Pad before each sled launch. Before being removed from the track, sleds were emptied of fuels, and the fuels were then transferred to storage containers. The sleds were then taken to Building 1176, where any remaining fuel was purged from the engines. Fuels used at the test track included the following: unsymmetrical dimethylhydrazine (UDMH), aniline, JP-4 (jet fuel), inhibited red fuming nitric acid (IRFNA), inhibited white fuming nitric acid (IWFNA), liquid oxygen (LOX), JPX (1:1 JP-4 and UDMH), dyes, solid rocket propellants, and possibly other compounds. Fuel spills were uncommon due to stringent safety precautions, though interviews with past employees have indicated that natural, topographic drainage trenches and drainage troughs could have received wastes. Solvents, such as trichloroethane, were commonly used in sled maintenance activities.

In 1983, Site SS-39 was identified as a potential contaminant source during an IRP records search. As a result, the site was included in a Phase I RI completed in 1992. Results of the Phase I RI indicated that the site cadmium in soil posed a potential risk to black-tailed jackrabbits, and that groundwater downgradient of the site contained TCE. After reviewing the Phase I RI report, the U.S. EPA Region VI requested additional soil and groundwater data. A Phase II RFI was completed in 1994, which delineated soil and groundwater contamination.

The site is listed as SWMUs 165, 177, 179, and 181 on the Hazardous and Solid Waste Amendment permit issued to Holloman AFB by U.S. EPA Region VI. These SWMUs were included in a RCRA facilities assessment in 1987. The investigations and studies performed for the site met the requirements of the IRP and RCRA program.

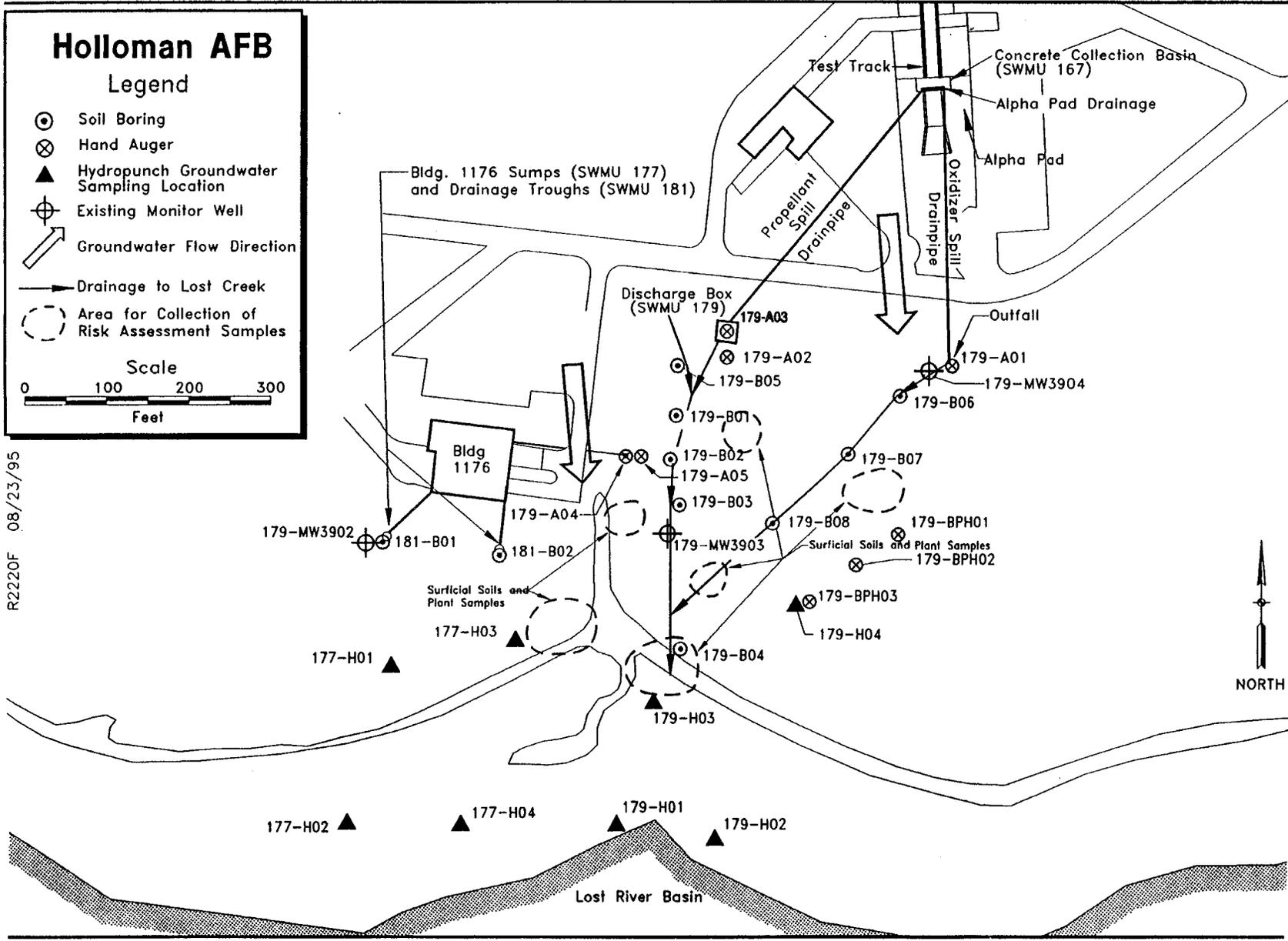


Figure 2-1. Map of IRP Site SS-39

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### Highlights of Community Participation

Copies of the following reports which contain information pertaining to the site are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b); and
- *Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Draft Final* (HAFB, 1994).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

The site investigations and the risk assessment conducted for the Site SS-39 indicate that no action is necessary to protect human health and the environment under CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Summary of Site Characteristics

The IRP record search, conducted in 1983, indicated that fuels, metals, and solvents may be present at the site. To determine the presence or absence of contamination at the site, Holloman AFB conducted a Phase I RI in 1991 and a Phase II RFI in 1994. A summary of the field investigations is presented below.

#### Soil

During the Phase I RI, five surface soil samples and two soil borings were collected at the site. The samples were analyzed by a certified laboratory for VOCs, total metals, and petroleum hydrocarbons. Results indicate that in the area of the oxidizer and propellant drainpipe outfalls, arsenic, beryllium, and lead were detected above established background levels in several samples. The highest concentrations of these metals were 28 mg/kg, 0.58 mg/kg, and 1300 mg/kg, respectively. VOCs, predominantly chlorinated compounds (tetrachloroethene, 95 mg/kg) were detected in soils around the drainage sumps at Building 1176.

During the Phase II RFI, 8 soil borings and 5 hand auger borings were drilled in drainage ditches downstream of the site. All borings were drilled to groundwater and samples were collected at 2-ft intervals. Samples were analyzed for SVOCs and metals. No SVOCs or metals were detected at concentrations above RCRA action levels.

### Groundwater

Four groundwater monitor wells were installed during the Phase I RI. One round of samples was collected from these wells. Samples were analyzed by a certified laboratory for VOCs, metals, anions, and total dissolved solids. Concentrations of TCE (0.24 mg/L), carbon tetrachloride (0.0058 mg/L), and TCE (0.059 mg/L), were detected in groundwater samples from wells near Building 1176, indicating that VOCs had migrated from the sumps to groundwater. Lead was detected at a concentration (0.019 mg/L) above the established background level in one groundwater sample.

Groundwater samples were analyzed for VOCs, but no groundwater constituents, including unconventional fuels, exceeded RCRA action levels. TCE was detected at concentrations ( $<38.8 \mu\text{g/L}$ ) in the groundwater samples collected downgradient of Building 1176.

During the Phase II RFI groundwater samples were collected from 15 temporary sampling locations installed using a direct push technology rig, and from two existing monitor wells. All samples were analyzed for VOCs. Several halogenated VOCs were detected at concentrations at or below detection limits; however, many were not confirmed so their presence is uncertain. TCE concentrations detected on-site monitor wells decreased by an order of magnitude 200 ft downgradient of the site.

### Summary of Site Risks

As part of the Phase I RI, a risk assessment was conducted to estimate the potential consequences to human health and the environment that could result if contamination at the site is not remediated. The risk assessment consisted of four basic steps: 1) data analysis and selection of chemicals of concern; 2) identification of exposure pathways and receptors (i.e., dermal contact, ingestion, or inhalation); 3) toxicity assessment of each contaminant; and 4) quantification of potential carcinogenic, noncarcinogenic, and ecological risks. A detailed description of the risk assessment is contained in the *Risk Assessment Report for the Remedial Investigation-Investigation, Study and Recommendation for 29 Waste Sites* (Holloman AFB, 1992b).

### Human Health Risk

The human health risks evaluated for the site were based on potential occupational exposure to site contaminants via inhalation.

Generally, a total carcinogenic risk of less than  $1 \times 10^{-6}$  for each chemical contaminant is considered acceptable. This is equivalent to a one-in-a-million excess cancer risk from exposure to that chemical at the site. In addition, the combined carcinogenic risk from all chemical contaminants must be equal to or less than  $1 \times 10^{-4}$ , a one-in-one-ten-thousand excess cancer risk. Noncarcinogenic risk is assessed on the basis of a hazard index, which is the ratio of potential daily chemical intake to an acceptable dose. For a noncarcinogenic risk to be acceptable, the hazard index should not exceed a value of 1.0.

The carcinogenic risk estimated for the occupational exposure scenario was  $1 \times 10^{-17}$ . This value indicates that adverse effects are unlikely.

### Ecological Risk

Ecological risk was evaluated using an ecological quotient, which estimates the potential ecological risks associated with contaminants of concern, primarily through ingestion of soil and/or contaminated plants by native biota. An ecological quotient of less than 1 indicates a low probability of adverse effects; a value between 1 and 10 indicates that there is a possibility of adverse ecological effects.

The Phase I RI risk assessment determined that an ecological quotient of 7.1, which indicates a potential ecological risk, existed from the site. This conclusion was based on modeled uptake of lead and cadmium for soil and beryllium, lead, and zinc in the surface water of Lost River.

The risk assessment performed in conjunction with the Phase II RFI used collected plant, jackrabbit tissue, and surface water samples to remove the uncertainty associated with the uptake models. Comparison of plant and jackrabbit tissue samples with concentrations known to cause adverse effects indicated a low potential for adverse ecological effects to terrestrial organisms. An aquatic environment quotient of 0.3 indicated that no adverse effects are expected as a result of the site.

### **Description of the Selected Alternative**

The remedial investigations and associated risk assessments conducted for the site indicated that no action is necessary to protect human health and the environment.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

**Table 1-1**

<b>IRP Site Number</b>	<b>IRP Site Name</b>	<b>RCRA Site Number</b>
SS-02 & SS-05	POL Spill Site Number 1 and POL Spill Site Number 2	AOC-T
OT-03	POL Tank Sludge Burial Site	SWMU 114
OT-04	Acid Trailer Burial Site	SWMU 102
SD-08	Refuse Collection Truck Washrack	SWMU 82
SS-12	Fuel Line Spill Number 1	Not applicable
OT-14	Former Entomology Shop	SWMU 197
OT-16	Existing Entomology Shop	AOC-A, SWMU 118, SWMU 132
OT-20	Waste Water Treatment Plant Grit Burial Site	SWMU 113A
OT-24	Former Equipment Maintenance Area	SWMU 134
DP-30 & SD-33	Grease Trap Disposal Pits and Cooking Grease Disposal Pits	SWMU 113B
OT-35	Spent Solvent Disposal Area	Not applicable
SS-36	Unconventional Fuel Spill Site	SWMU 129, SWMU 178
SS-39	Missile Fuel Spill	SWMU 165, SWMU 177, SWMU 179, and SWMU 181

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## Declaration

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**Statutory Preference for Treatment as a  
Principal Element is not Applicable  
and a Five-Year Review is not Required**

**Site Name and Location**

IRP Site SS-36 (RCRA SWMUs 129 and 178)  
Unconventional Fuel Spill Site  
Holloman Air Force Base, New Mexico

**Statement of Basis and Purpose**

This decision document presents the selected remedial action for the referenced site, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

**Description of the Selected Remedy: No Action**

Site investigations and a risk assessment conducted for the site indicated that no action is necessary to protect human health and the environment. However, a voluntary remedial action was conducted to remove petroleum-contaminated soils exceeding the NMED-cleanup level for Holloman AFB.

**Declaration Statement**

The remedial investigation, associated risk assessment, RCRA facility investigation, and voluntary remedial action conducted for the site indicate that conditions at the site do not require action to ensure the protection of human health and the environment. Because no hazardous substances will remain on site above health-based levels, a five-year review is not necessary.

If new evidence suggesting the need for further action becomes available, the site closeout decision may be changed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.

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Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

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Date

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Bruce Carlson  
Brigadier General, USAF Commander

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Date

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## Decision Summary

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### Site Name and Location

IRP Site SS-36, the Unconventional Fuel Spill site, is located near former Buildings 1191 and 1192 at Holloman AFB, New Mexico. The first acid storage area and the former aniline storage area (former Building 1112) are also included in Site SS-36. The first acid storage area is located west of Building 1191 and the former aniline storage area to the east. The site has been converted to the Base Equestrian Facility and fuels are no longer stored on site. The foundations for former Buildings 1191, 1192, and 1112 now serve as horse stables. Site topography is relatively flat, and the area is sparsely vegetated except in the horse corrals where the area is void of vegetation. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

Soil at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Groundwater flow direction is controlled by southwest-trending arroyos, and is to the northwest, following the Lost River drainage system (see Figure 1-2). Groundwater occurs at approximately 30 ft bgl at the site and flows to the west-northwest toward the Lost River drainage basin.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as Class III-B aquifer and is considered non-potable.

### Site History and Enforcement Activities

Between 1952 and 1964, Site SS-36 served as an unconventional fuels storage area. Fuels stored at the site included unsymmetrical dimethylhydrazine, JP-4, inhibited red fuming nitric acid, inhibited white fuming nitric acid, and aniline. Buildings 1191 and 1192 had a total of four runoff pits that received all spilled fuels and floor washings from the concrete pad storage and mixing areas. Three runoff pits were located south of Building 1192 and one runoff pit was located south of Building 1191. The sumps are constructed of reinforced concrete with an approximated diameter of 6 ft and depth of 9 ft. The pits appear to have been filled with gravel and are open at the bottom. Building 1192 stored oxidizers, and Building 1191 stored propellants.

In 1983, Site SS-36 was identified as a potential contaminant source during an IRP records search. As a result, the site was included in a Phase I RI completed in 1992. Results of the Phase I RI indicated that petroleum contamination was present in the soil and groundwater beneath the site. Results of the Phase I RI indicated that groundwater beneath the site did not pose an unacceptable risk to human health and the environment. However, because of insufficient soil data and an unanticipated groundwater flow direction, an additional investigation was recommended. After review of the Phase I RI report, the U.S. EPA concurred with the recommendations. A Phase II RFI was conducted in 1994. Results of the investigation indicated that the site does not pose unacceptable risks, but that a small area of petroleum-contaminated soil above the Base-specific cleanup level was present. Holloman AFB, during a voluntary remedial action in 1994, removed the TRPH-contaminated soil. Groundwater contamination was not detected during a Phase II RFI conducted in 1994.

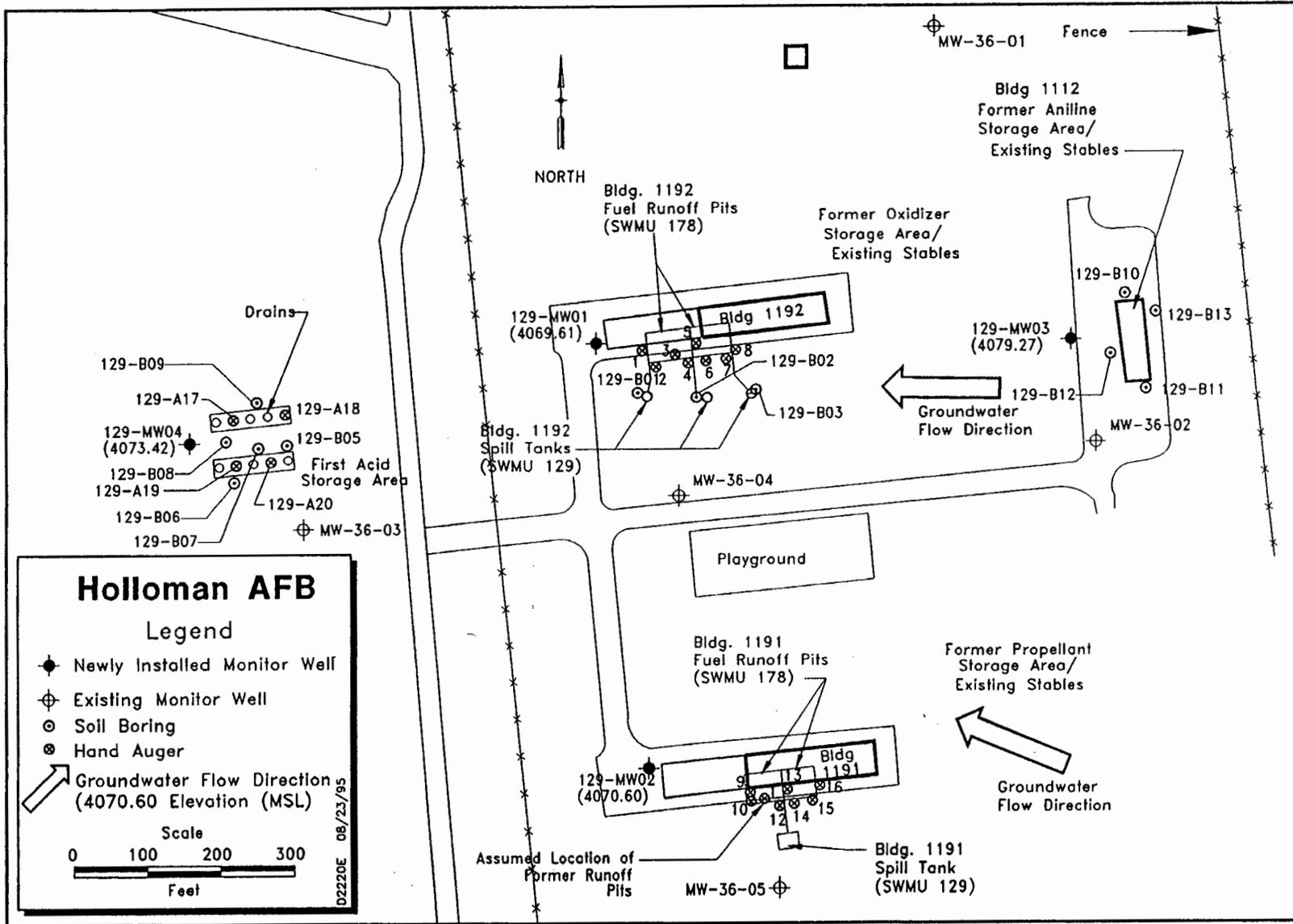


Figure 2-1. Map of IRP Site SS-36

The site is listed as SWMUs 129 and 178 on the Hazardous and Solid Waste Amendments Permit issued to Holloman AFB by U.S. EPA Region VI. These SWMUs were included in a RCRA facilities assessment in 1987. The investigation and studies performed for the site met the requirements of the IRP and RCRA program.

### Highlights of Community Participation

Copies of the following reports which contain information pertaining to the site are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b); and
- *Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

Petroleum hydrocarbon concentrations in the soil at Site SS-36 exceeded the Base-specific cleanup level of 1000 mg/kg for TRPH. Holloman AFB conducted a voluntary remedial action in 1995 to remove petroleum-contaminated soil exceeding the cleanup level.

The site investigations, risk assessment, and voluntary remedial action, indicate that no action is necessary to protect human health and the environment under CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan.

### Summary of Site Characteristics

The IRP records search conducted in 1983 indicated that contamination may be present at the site. The Phase I RI for Site SS-36 involved installation of a five-well groundwater monitoring network. Groundwater collected during this investigation was analyzed for volatile organic compounds (VOCs), total recoverable petroleum hydrocarbons (TRPH), total metals, total dissolved solids, and anions. No soil samples were collected during this investigation. Results from this investigation recommended that additional samples be collected at a later date. Subsequently, additional groundwater samples and soil samples were collected during the 1994 RFI. Four additional groundwater monitor wells were installed, and a total of 59 soil samples were

collected. All RFI groundwater samples were collected for lead, nitrate-nitrite, TRPH, and SVOCs, and soil samples for TRPH, SVOCs, and lead. A summary of the analytical results are presented below.

### Soil

Results from the Phase II RFI indicate that no visibly contaminated soil was observed. TRPH was detected in 19 samples; however, TRPH concentrations exceeded the cleanup level in surface samples from only two locations. No VOCs or SVOCs were detected at concentrations above RCRA action levels. The only VOCs detected above detection limits and not detected in the method blanks were toluene, acetone, and methyl ethyl ketone (the last two compounds being common lab contaminants).

Lead was detected at concentrations exceeding background levels established for Holloman AFB in seven samples, and exceeding trigger criteria in only one soil sample—a hand-auger sample collected from a drain at the former first acid storage area. Elevated levels of lead were detected in all four drain samples, which indicates that the metal drains themselves may be the possible sources of the lead. Soil pH levels in potentially contaminated samples ranged from 6.4 to 8.4, indicating that no releases of nitric acid have occurred at the site. Soil pH in background samples range from 7.26 to 7.74.

### Groundwater

Groundwater samples collected during the Phase I RI indicated that two constituents, lead and nitrate-nitrite, may be above established background levels. Samples collected for the Phase II RFI detected no constituents above established background levels. No TRPH or SVOCs were detected in the groundwater samples.

### Summary of Site Risks

As part of the Phase I RI, a risk assessment was conducted to estimate the potential consequences to human health and the environment that could result if the soil contamination at this site is not remediated. The risk assessment consisted of four basic steps: 1) data analysis and selection of chemicals of concern; 2) identification of exposure pathways and receptors (i.e., dermal contact, ingestion, or inhalation); 3) toxicity assessment of each contaminant; and 4) quantification of potential carcinogenic, noncarcinogenic, and ecological risks. A detailed description of the risk assessment is contained in the *Risk Assessment Report for the Remedial Investigation-Investigation, Study and Recommendation for 29 Waste Sites* (Holloman AFB, 1992b).

A second risk assessment was conducted in conjunction with the 1994 RFI, and incorporated the analytical results from the 1994 investigation. The same methodology was used in this risk assessment as in the 1992 one.

### Human Health Risks

A total carcinogenic risk of less than  $1 \times 10^{-6}$  for each chemical contaminant is considered acceptable. This is equivalent to a one-in-a-million excess cancer risk from exposure to that chemical at the site. In addition, the combined carcinogenic risk from all chemical contaminants must be equal to or less than  $1 \times 10^{-4}$ , a one-in-one-ten-thousand excess cancer risk. Noncarcinogenic risk is assessed on the basis of a hazard index, which is the ratio of potential daily chemical intake to an acceptable dose. For a noncarcinogenic risk to be acceptable, the hazard index should not exceed a value of 1.0.

The Phase I RI risk assessment determined that there were no existing or potential human receptors for Site SS-36. Therefore, human health risks were not calculated. The risk assessment calculated risk values for all potential scenarios and found all to be acceptable. For the on-site worker scenario, carcinogenic risks ranged

from  $3 \times 10^{-7}$  to  $4 \times 10^{-7}$ . Present and future recreational carcinogenic risks are  $2 \times 10^{-7}$  to  $7 \times 10^{-7}$  for the average and reasonable maximum exposure scenarios. Potential future construction worker carcinogenic risks are  $3 \times 10^{-10}$  and  $5 \times 10^{-10}$  for average and reasonable maximum exposures, respectively.

The noncarcinogenic hazard index for this the site was not assessed because none of the contaminants had noncarcinogenic toxicity values.

### **Ecological Risks**

Ecological risks were evaluated using an ecological quotient, which calculates the potential ecological risks associated with the contaminants of concern through the ingestion of soil and/or contaminated plants. Ecological quotients above a value of 1 represent the possibility of adverse environmental effects occurring from the intake of contaminants. No adverse ecological effects are expected to occur at sites with an ecological quotient of less than 1.

The ecological quotient from the 1992 risk assessment for aquatic organisms of  $1 \times 10^{-4}$  was based on modeled surface water concentrations in Malone Draw. The ecological quotient was  $1 \times 10^{-5}$  for the black-tailed jackrabbit. These results indicate a very low possibility of any adverse environmental effects from contaminants of potential concern at the site. An ecological quotient for the 1994 risk assessment was calculated for the site using the additional Phase II RFI data. A ecological quotient of 0.3 was determined for black-tailed jackrabbits. Therefore the risk assessment concluded that a low probability of any adverse environmental effects from contaminant levels at the site exist.

### **Description of the Selected Alternative**

Due to the limited amount of contaminated soil exceeding the Base-specific cleanup level, Holloman AFB conducted a voluntary remedial action in 1995. The removal was performed in accordance with the approved *Base-Wide POL Remediation Plan* (HAFB, 1995). Less than 1 yd<sup>3</sup> of petroleum-contaminated soil was excavated from the site. The site investigations and associated risk assessments indicate that no action is necessary to protect human health and the environment.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

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## Declaration

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### **Statutory Preference for Treatment as a Principal Element is not Applicable and a Five-Year Review is not Required**

#### **Site Name and Location**

IRP Site OT-16 (RCRA SWMU 118, SWMU 132, and AOC-A)  
Existing Entomology Shop Area  
Holloman Air Force Base, New Mexico

#### **Statement of Basis and Purpose**

This decision document presents the selected remedial action for the referenced site, in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of New Mexico concurs on the remedy.

#### **Description of the Selected Remedy: No Action**

The remedial investigation and risk assessment conducted for the site indicated that no action is necessary to protect human health and the environment. As part of the no action remedy, petroleum-contaminated and PCB-contaminated soils exceeding the regulatory clean-up levels for Holloman AFB will be remediated.

#### **Declaration Statement**

The remedial investigation and risk assessment conducted for the site indicate that conditions at the site do not require further action to ensure the protection of human health and the environment. Because no hazardous substances will remain on site above health-based levels, a five-year review is not necessary.

If new evidence suggesting the need for further action becomes available, the site closeout decision may be changed. Likewise, future changes in land use, environmental regulations, or environmental laws may reverse the closeout decision.

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Mark Weidler, Cabinet Secretary  
New Mexico Environment Department

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Date

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Bruce Carlson  
Brigadier General, USAF Commander

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Date

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## Decision Summary

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### Site Name and Location

IRP Site OT-16, the Existing Entomology Shop Area, is located at Building 21 in the southeastern part of Holloman AFB. The topography of the site is relatively flat and is covered with gravel. No vegetation exists on site. Figure 1-1 shows the location of the site at Holloman AFB, and Figure 2-1 shows the site layout.

The near-surface geology at Holloman AFB consists of interbedded sands, silts, and clays. Soils are low to moderately permeable and mildly alkaline. Groundwater occurs at approximately 5 ft below ground surface at Site OT-16. Local and regional groundwater flow direction is controlled by southwest-trending arroyos. In the southern portion of Holloman AFB, regional groundwater flow is to the southwest, following the Dillard Draw surficial drainage system (see Figure 1-2).

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. Based on the *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered non-potable.

### Site History and Enforcement Activities

Prior to its conversion to an entomology shop, former Building 21 contained six diesel generators and several transformers used for power generation. After being converted to the existing Entomology Shop, rinse water from washing of pesticide mixing equipment was discharged from 1977 to 1980 to a septic tank leach field located in back of the building. Diesel fuel may have been used to solubilize pesticides and may also have been discharged to the leach field. From 1980 until the building was connected to the Base sewer system in 1988, rinse water from washing of mixing equipment did not go to a septic tank, but was instead discharged into a pit/boring on the northwest side of the building. A pesticide holding tank is located on the southwest side of Building 21, and the tank is housed in a concrete containment box. No spills were reported or documented at the pesticide holding tank or containment box.

IRP Site OT-16 was identified as a potential contaminant source during an IRP records search conducted in 1983. As a result, the site was included in a Phase I RI completed in 1992. Results of the Phase I RI indicated further investigation was required to delineate soil and groundwater contamination. Upon reviewing the Phase I RI report, U.S. EPA Region VI agreed with the recommendation for additional investigation. Holloman AFB completed a Phase II RFI in 1994 that fully delineated soil and groundwater contamination. Soils from the site with TRPH levels greater than 1000 mg/kg will be excavated in accordance with the *Base-Wide POL Remediation Plan*, Holloman, 1995).

The site is also listed as SWMU 118, SWMU 132, and AOC-A on the Hazardous and Solid Waste Amendment permit issued to Holloman AFB by U.S. EPA Region VI. The SWMUs were included in a RCRA Facilities Assessment in 1987. The investigation and studies performed for the site met the requirements of both the IRP and RCRA program.

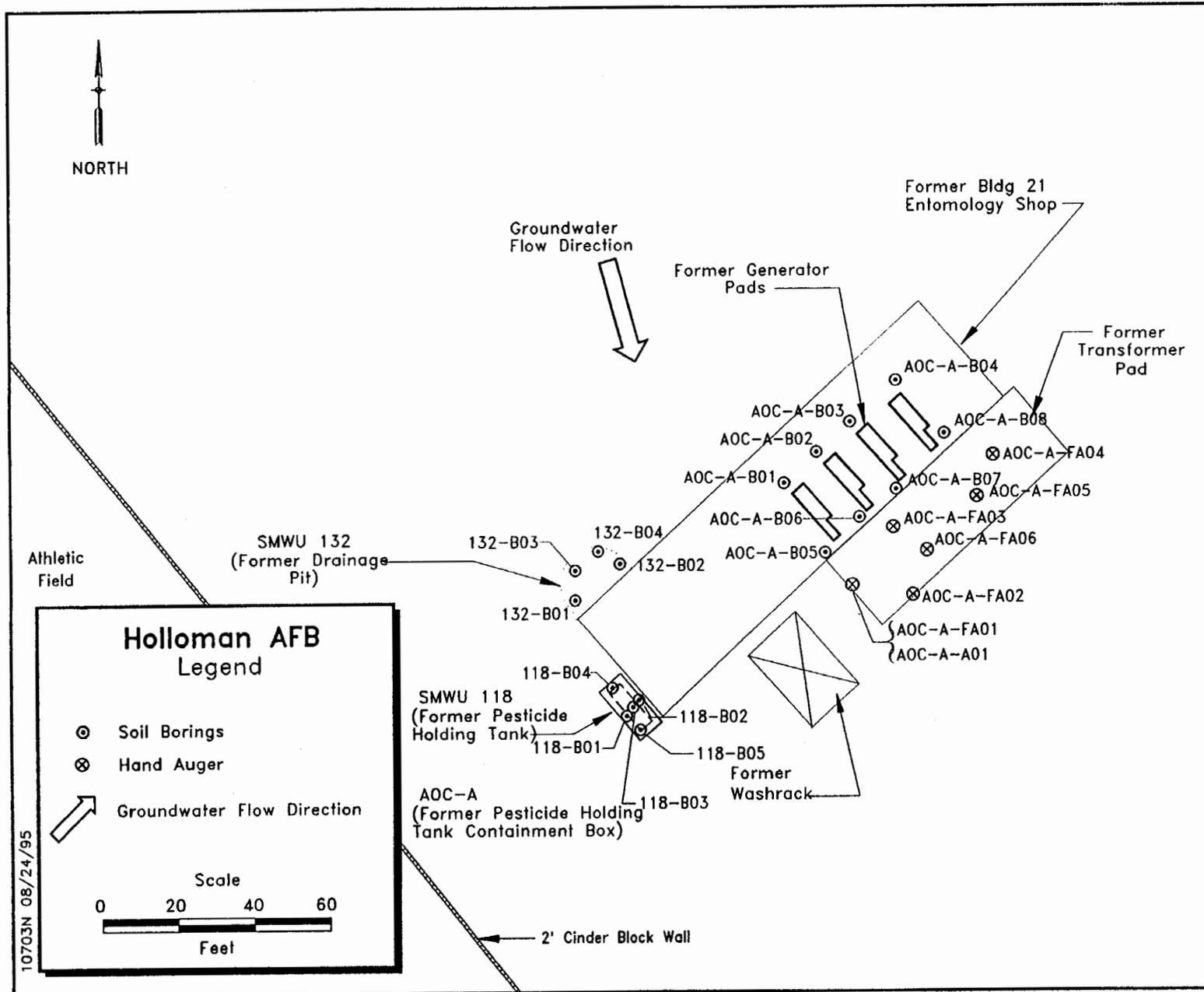


Figure 2-1. Map of IRP Site OT-16

10703N 08/2/80 N507011

### Highlights of Community Participation

Copies of the following reports which contain information pertaining to the site are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (Holloman AFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (Holloman AFB, 1992b); and
- *Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Draft Final* (Holloman AFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. At least one week prior to the meeting date, announcements of the meeting are published in the local newspaper and/or area radio stations. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### Scope and Role of the Response Action

The remedial investigations and the risk assessment conducted for the Site OT-16 indicated that no action is necessary at the site to protect human health and the environment under CERCLA. However, a removal of soils with TRPH concentrations greater than 1000 µg/kg will be conducted in accordance with the *Base-Wide POL Remediation Plan* (Holloman, 1995).

### Summary of Site Characteristics

The IRP record search for Site OT-16 indicated that small amounts of pesticides and PCBs may be present at the site. To determine the presence or absence of contamination at Site OT-16, Holloman AFB conducted a Phase I RI in July 1991 to delineate the nature and extent of contamination, Holloman AFB completed a Phase II RFI in 1994. A summary of field investigation results is presented below.

#### Soil

The Phase I RI of SWMU 132 and AOC-A focused on the former disposal pit/boring and the pesticide tank containment box. One boring to groundwater was drilled in the middle of the drainage pit, and two samples were collected from the boring. One sample was collected from just below the top of the pit, and one was collected from the bottom of the boring. Soil samples were analyzed by a certified laboratory for VOCs, petroleum hydrocarbons, organochlorine pesticides, organophosphorus pesticides, and chlorinated herbicides. Pesticides and VOCs detections in soil samples from the Phase I investigation indicated that a release had occurred from activities at the Entomology Shop. 4,4'-DDT (12 µg/kg), alpha-BHC (0.19 µg/kg), delta-BHC (0.65 µg/kg), and methyl parathion (1.5 µg/kg) were detected in the surface soil sample, but none of these

analytes were detected in the underlying sample. No analytes were detected at concentrations above soil action levels.

During the Phase II RFI, five soil borings were drilled at SWMU 118, four soil borings were drilled at SWMU 132, eight soil borings were drilled around the former Building 21 generator slabs, and six hand auger samples were collected at the former transformer pad. Soil samples from SWMU 118 were analyzed for TRPH, VOCs, organochlorine pesticides, organophosphorus pesticides and PCBs, and chlorinated herbicides. Soil samples from SWMU 132 were analyzed for organochlorine pesticides and PCBs. Soil samples from AOC-A were analyzed for TRPH and VOCs.

Three analytes were detected above trigger criteria. PCB-1260 was detected at a maximum concentration of 639  $\mu\text{g}/\text{kg}$ . TRPH was detected at concentrations as high as 10,300  $\text{mg}/\text{kg}$ . Heptachlor epoxide was detected at an unconfirmed concentration of 386  $\mu\text{g}/\text{kg}$ .

### Groundwater

Four monitor wells were sampled and analyzed by a certified laboratory for VOCs, organochlorine pesticides, organophosphorus pesticides, chlorinated herbicides, anions, and total dissolved solids. Organochlorine pesticides and VOCs were detected in all four monitor wells. The highest concentrations and most numerous detections of pesticides and VOCs were in samples from the upgradient monitor well. Benzene (0.0023  $\text{mg}/\text{L}$ ), dieldrin (0.00015  $\text{mg}/\text{L}$ ), trichloroethene (0.0042  $\text{mg}/\text{L}$ ), alpha-BHC (0.0015  $\text{mg}/\text{L}$ ), and gamma-BHC (0.001  $\text{mg}/\text{L}$ ) were all detected in the upgradient well.

During the Phase II investigation, groundwater samples were collected for laboratory analysis from the four existing monitor wells and from seven temporary sampling points using direct push technology. Groundwater samples from monitor wells were analyzed for VOCs, and groundwater samples from Geoprobe locations were analyzed for organochlorine pesticides. Heptachlor epoxide and gamma-BHC were detected above trigger criteria at maximum concentrations of 0.0315  $\mu\text{g}/\text{L}$  and 0.372  $\mu\text{g}/\text{L}$ , respectively. Figure 2-2 shows the location of the Phase I RFI groundwater sample locations.

### Summary of Site Risks

A quantitative risk assessment was conducted for IRP Site 16 using data collected during the Phase I and Phase II investigations. The risk assessment methodology is presented in the *Risk Assessment Report for the Investigation—Investigation, Study and Recommendations for 29 Waste Sites* (Holloman AFB, 1992b).

### Human Health Risks

Generally, a total carcinogenic risk of less than  $1 \times 10^{-6}$  for each chemical contaminant is considered acceptable. This is equivalent to a one-in-one-million excess cancer risk from exposure to that chemical at the site. In addition, the combined carcinogenic risk from all chemical contaminants must be equal to or less than  $1 \times 10^{-4}$ , a one-in-ten thousand excess cancer risk. Noncarcinogenic risk is assessed on the basis of a hazard index, which is the ratio of potential daily chemical intake to an acceptable dose. For a noncarcinogenic risk to be acceptable, the hazard index cannot exceed a value of 1.0.

Risk values for all scenarios evaluated were within the range considered acceptable and are presented in the table below.

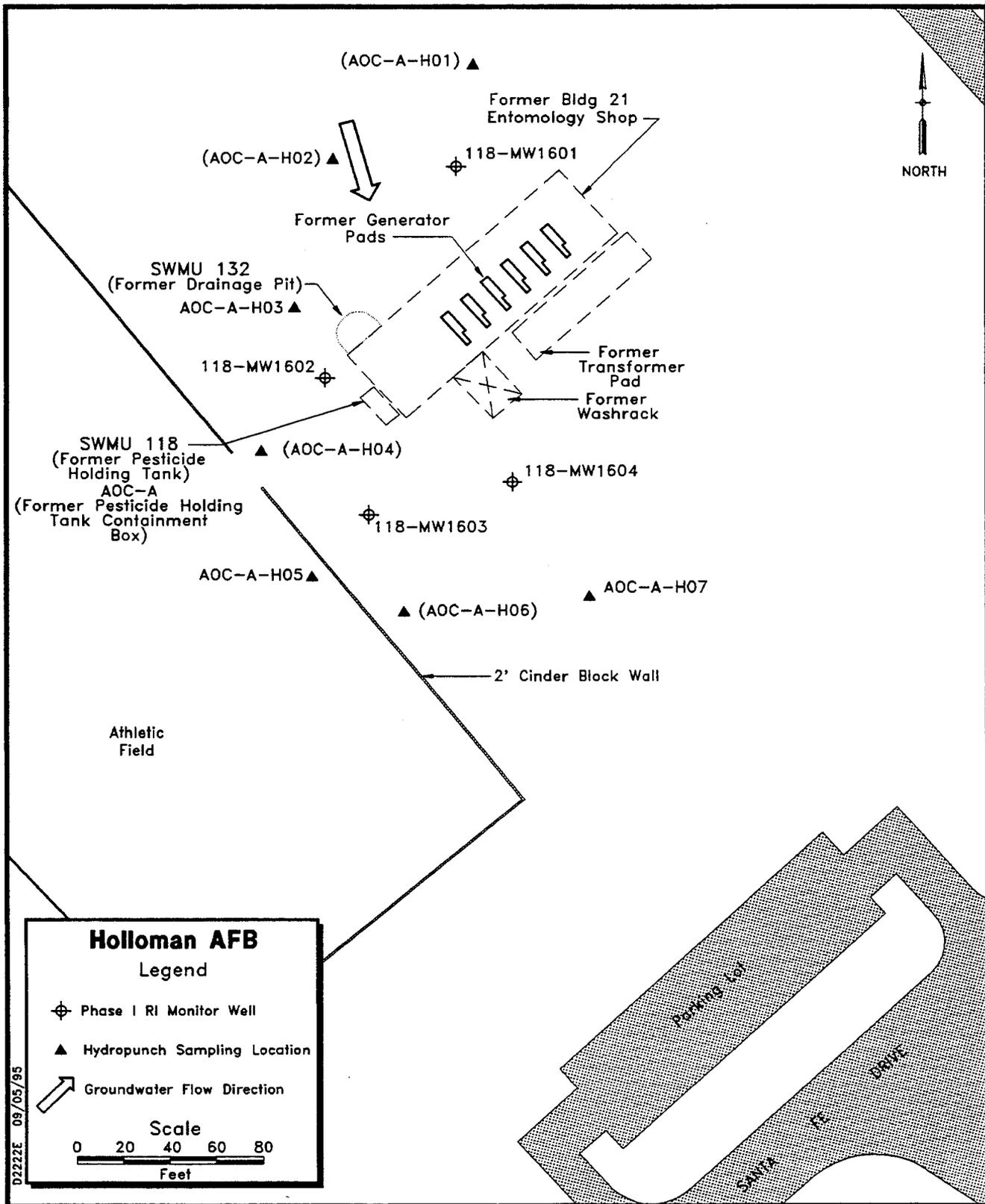


Figure 2-2. Phase II Groundwater Sample Locations

**Summary of Estimated Human Health Risks for Site OT-16**

Exposure Scenario	Estimated Carcinogenic Risk		Estimated Hazard Indices	
	Average	Reasonable Maximum	Average	Reasonable Maximum
Recreational child	--	--	0.01	0.08
Residential child or adult	$4 \times 10^{-10}$	$3 \times 10^{-9}$	$2 \times 10^{-13}$	$6 \times 10^{-13}$
Construction worker	$3 \times 10^{-8}$	$1 \times 10^{-7}$	0.03	0.2

**Ecological Risk**

Ecological risk was evaluated using an ecological quotient (EQ). The EQ estimates the potential ecological risks associated with contaminants of concern primarily through ingestion of soil and/or contaminated plants by native biota. An EQ of less than 1 indicates a low probability of adverse effects. An EQ between 1 and 10 indicates that there is a possibility of adverse ecological effects.

The environmental evaluation for this site determined an EQ for the black-tailed jackrabbit of 0.05, indicating low probability of adverse environmental effects on native fauna.

**Description of the Selected Alternative**

The remedial investigations and associated risk assessments conducted for the site indicated that no action is necessary to protect human health and the environment. As part of the no action remedy and site closeout procedures, soils with petroleum concentrations exceeding the 1000 mg/kg TRPH level established by the NMED as the clean-up level at Holloman AFB will be excavated. Although the remedial investigation and risk assessment indicated PCBs levels at the site do not pose a risk to human health or the environment, PCB-contaminated soil will be remediated concurrently with TRPH contaminated soils.

**Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.

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## Decision Summary

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### Site Name, Location and Description

IRP Site OT-24, the former Equipment Maintenance Area, occupies approximately 14 acres south of the Kelly Road and Hale Drive intersection in the West Base area. Two drainage ditches run north-south along the east and west sides of the site. Hale Drive runs along the eastern ditch, and Buildings 920-924 are located along the western side of the road. A large earthen berm is located east of the ditch. The topography of the site slopes gently to the southwest. Site vegetation consists mainly of grasses and sagebrush. Figure 1-1 shows the location of Site OT-24 at Holloman AFB, and Figure 2-1 shows the layout.

Soils at the site consists of interbedded sands, silts, and clays. The soils are low to moderately permeable and mildly alkaline. Regional groundwater flow direction is controlled by southwest-trending arroyos and is to the southwest, following the Dillard Draw drainage system (see Figure 1-2). At Site OT-24, groundwater occurs at approximately 12 to 16.5 ft bgl and flows to the south-southwest, toward Dillard Draw.

The unconfined aquifer beneath the site, as well as the remainder of Holloman AFB, exceeds the New Mexico Human Health Standards for total dissolved solids and sulfate concentrations and has been designated as unfit for human consumption based on NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103. On the basis of *Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (EPA, 1986), the unconfined aquifer beneath Holloman AFB is classified as a Class III-B aquifer and is considered nonpotable.

### Site History and Enforcement Activities

Maintenance operations were conducted in Buildings 920 through 924 at Site OT-24 from 1959 to 1970. Waste solvents, cleaners, and oils used during these operations were washed down drains and into septic tanks. Interviews and a site inspection conducted in 1991 indicated that wastes were not disposed of in the drainage ditches.

Site OT-24 was identified as a potential contaminant source during an IRP records search conducted in 1983. As a result, the site was included in an Phase RI conducted in 1991. Results of the Phase I RI indicate that, although low levels of BTEX were detected in the groundwater, the site does not pose a threat to human health or the environment. After reviewing the Phase I RI report, U.S. EPA Region VI requested additional groundwater monitoring to confirm the presence of BTEX. A Phase II RFI conducted in 1994 did not confirm the presence of BTEX in the groundwater.

### Highlights of Community Participation

Copies of the following reports, which contain information pertaining to the site, are available to the public through the administrative record located at the Holloman AFB and Alamogordo Libraries:

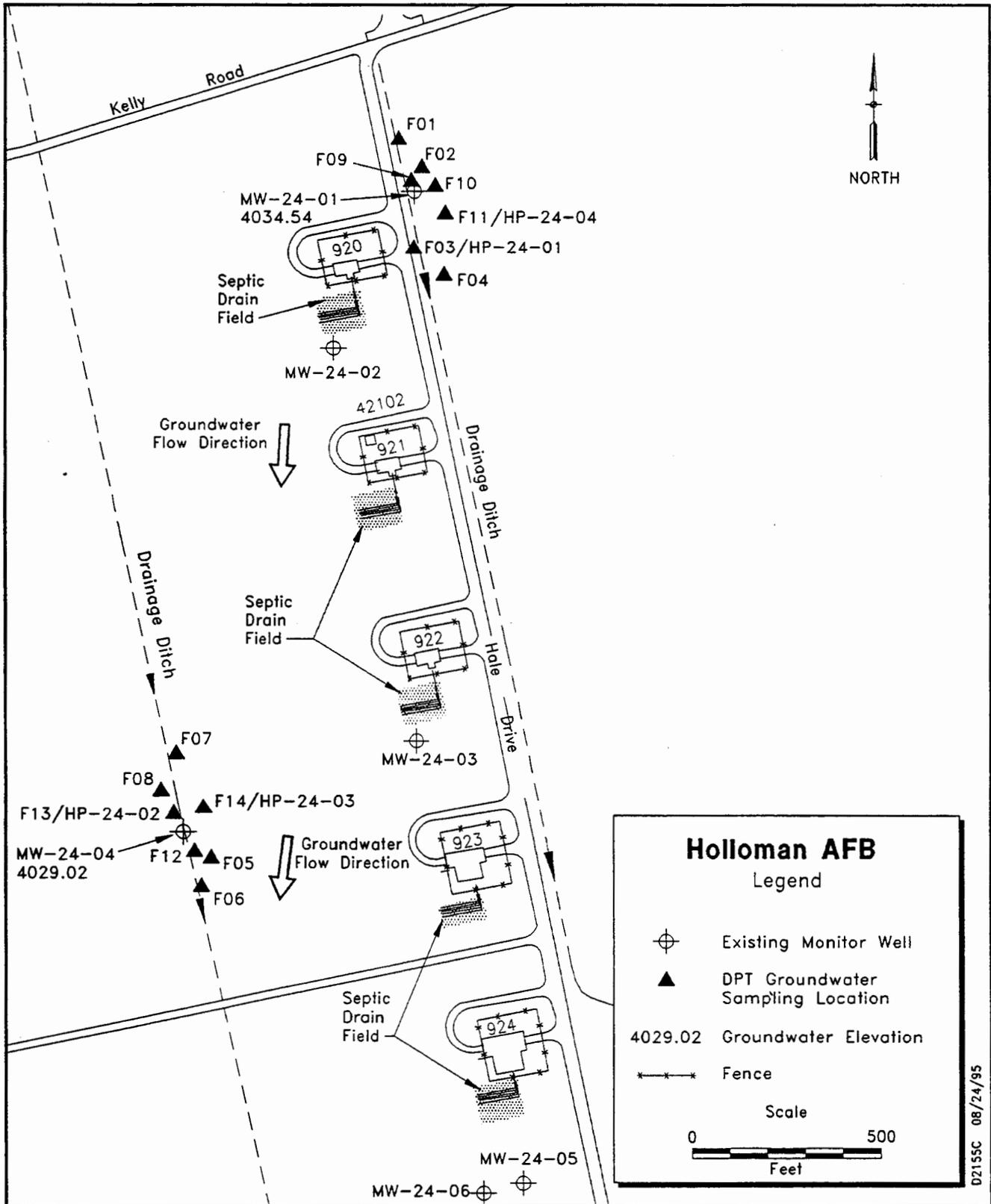


Figure 2-1. Map of IRP Site OT-24

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- *Remedial Investigation Report—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992a);
- *Risk Assessment Report for the Remedial Investigation—Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b); and
- *Phase II RCRA Facility Investigation Report, Table 1 Solid Waste Management Units, Draft Final* (HAFB, 1995).

Public meetings are held semiannually by Holloman AFB to announce the availability of reports and present issues pertaining to the IRP sites on the Base. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) are present at these meetings to address public comments. No comments were received regarding the site at these meetings.

This decision document presents the selected remedial action for the site as chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan.

### **Scope and Role of the Response Action**

The Phase I RI, the risk assessment, and the Phase II RFI conducted for Site OT-24 indicate that no action is necessary at Site OT-24 to protect human health or the environment under CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan.

### **Summary of Site Characteristics**

The IRP records search for the site indicated that groundwater contamination may be present as a result of past maintenance activities conducted at the site. During the Phase I RI, six monitor wells were installed and sampled for VOCs, total metals, anions, and total dissolved solids. Benzene was detected in the northernmost well (5.5 µg/L) and the southernmost well (16 µg/L). Both of these wells, which are located adjacent to drainage ditches, contained detectable concentrations of other BTEX constituents.

During the Phase II RFI, groundwater samples were collected from 14 temporary standpipes installed with a direct push technology rig and recollected from the two monitor wells with previously detected BTEX concentrations. The samples from standpipes were screened for BTEX with a field gas chromatograph, and four samples were submitted to a certified laboratory for confirmation analysis. BTEX concentrations were not detected in the two monitor wells, but low levels of benzene (0.55 and 69 µg/L) were detected in two isolated temporary standpipe locations in the northern portion of the site.

### **Summary of Site Risks**

As part of the Phase I RI, a risk assessment was conducted to estimate the potential consequences to human health and the environment that could result if contamination at this site is not remediated. The risk assessment

consisted of four basic steps: 1) data analysis and selection of chemicals of concern; 2) identification of exposure pathways and receptors (i.e., dermal contact, ingestion, or inhalation); 3) toxicity assessment of each contaminant; and 4) quantification of potential carcinogenic, noncarcinogenic, and ecological risks. A detailed description of the risk assessment is contained in the *Risk Assessment Report for the Remedial Investigation-Investigation, Study and Recommendation for 29 Waste Sites* (HAFB, 1992b).

### **Human Health Risks**

The human health risks evaluated for this site were based on the hypothetical exposure of off-Base residents to contaminated groundwater via an off-Base water well. This exposure does not exist because groundwater beneath Holloman AFB is Class III B (nonpotable) aquifer and, therefore, is not considered a potential pathway. However, this hypothetical exposure was evaluated because the aquifer had not been fully characterized in 1991 when the risk assessment was conducted. Groundwater modeling indicated that the low levels of contaminants, which were not detected during the Phase II RFI, would not reach the hypothetical receptor location, therefore, the site does not pose a unacceptable risk to human health.

### **Ecological Risk**

Ecological risk was evaluated using an ecological quotient, which estimates the potential ecological risks associated with contaminants of concern, primarily through ingestion of soil and/or contaminated plants by native biota. An ecological quotient of less than 1 indicates a low probability of adverse effects; a value between 1 and 10 indicates that there is a possibility of adverse ecological effects. At Site OT-24, the total ecological quotient for black-tailed jack rabbits, selected as the indicator species, ingesting plants from the site was determined to be  $3.2 \times 10^{-5}$ . This value indicates that the site does not pose an unacceptable risk to the environment.

### **Description of Selected Alternative**

The Phase I RI, risk assessment, and Phase II RFI conducted for the site indicate that no action is necessary to protect human health and the environment.

### **Responsiveness Summary**

Restoration Advisory Board meetings were held semiannually to present information about the site to the public. Representatives from Holloman AFB and the U.S. Army Corps of Engineers (Omaha District) were present at these meetings to answer questions pertaining to the site. No comments were received during the meetings; therefore, no significant changes to the selected remedial action, as presented, were necessary.