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**LETTER OF TRANSMITTAL**



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DATE	MARCH 21, 2007	JOB NO	9050361
ATTENTION	Mr. George Fish		
RE	Statement of Basis for Approval of No Further Action for Ten Solid Waste Management Units		

TO Holloman Air Force Base  
CES/CEV  
5500 Tabosa Avenue  
Holloman AFB, NM 88330-8458

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**John Kieling - NMED**  
 Cornelius Amindyas - NMED

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 Frank Gardner - Bhat

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COPY TO \_\_\_\_\_ SIGNED: Frank Gardner

**STATEMENT OF BASIS  
FOR APPROVAL OF  
NO FURTHER ACTION FOR TEN SOLID WASTE  
MANAGEMENT UNITS**

**RCRA CORRECTIVE ACTION PROGRAM  
HOLLOMAN AFB, NEW MEXICO**



Prepared By:

**49 CES/CEV  
Environmental Flight  
550 Tabosa Avenue  
Holloman Air Force Base  
New Mexico**

**March 2007**



**STATEMENT OF BASIS FOR APPROVAL OF NO FURTHER  
ACTION FOR TEN SOLID WASTE MANAGEMENT UNITS  
RCRA CORRECTIVE ACTION PROGRAM  
HOLLOMAN AFB, NEW MEXICO**

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## ACRONYMS AND ABBREVIATIONS

AAF	Army Air Field
AFB	Air Force Base
amsl	Above mean sea level
AOC	Area of Concern
AS	Air Sparging
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
BTEX	Benzene, toluene, ethyl benzene, xylenes
BHUST	Base Hospital Underground Storage Tank
CA	Corrective Action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES/CEV	Civil Engineering Squadron/Combat Engineer Vehicle
COPC	Chemicals of potential concern
CSM	Conceptual site model
cy	Cubic yards
DPT	Direct Push Technology
DRO	Diesel-Range Organics
EM	Exposure Model
ERP	Environmental Restoration Program
ESA	Ecological Screening Assessment
°F	Degrees Fahrenheit
ft	Feet or foot
FWENC	Foster-Wheeler Environmental Corporation
GRO	Gasoline-Range Organics
HAFB	Holloman Air Force Base
HHRA	Human Health Risk Assessment
HSWA	Hazardous and Solid Waste Amendments
HVAC	Heating, ventilation, and air conditioning
IRP	Installation Restoration Program
J&E	Johnson and Ettinger
JP-4	Jet Fuel (formula 4)
MCL	Maximum Contaminant Level
mg/kg	Milligrams per kilogram
mg/L	Milligram per liter
µg/m <sup>3</sup>	Micrograms per cubic meter
µg/g	Micrograms per gram
µg/kg	Micrograms per kilogram
ND	Not detected

NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
ORO	Oil-Range Organics
OWS	Oil/Water Separator
pCi/g	PicoCuries per gram
PA	Preliminary Assessment
PCB	Polychlorinated Biphenyls
PCS	Petroleum-Contaminated Soils
PID	Photoionization Detector
POL	Petroleum, Oil and Lubricants
PRG	Preliminary Remediation Goals
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROEs	Routes of exposure
SI	Site Investigation
SOB	Statement of Basis
SSL	Soil Screening Level
SSTLs	Site-Specific Target Levels
SVE	Soil Vapor Extraction
SVOC	Semi-volatile organic compound
SWMU	Solid Waste Management Unit
T&D	Transportation and disposal
TAL	Target Analyte List
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TPHCWG	Total Petroleum Hydrocarbon Criteria Working Group
TRPH	Total Recoverable Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UTL	Upper tolerance limit
VCM	Voluntary Corrective Measures
VOC	Volatile Organic Compounds

## **A. INTRODUCTION**

The New Mexico Environment Department (NMED) has made a final determination to approve the Holloman Air Force Base (HAFB) request to remove 10 Solid Waste Management Units (SWMUs) from the Hazardous and Solid Waste Amendments (HSWA) Corrective Action module Resource Conservation and Recovery Act (RCRA) permit No. NM 657214422-1.

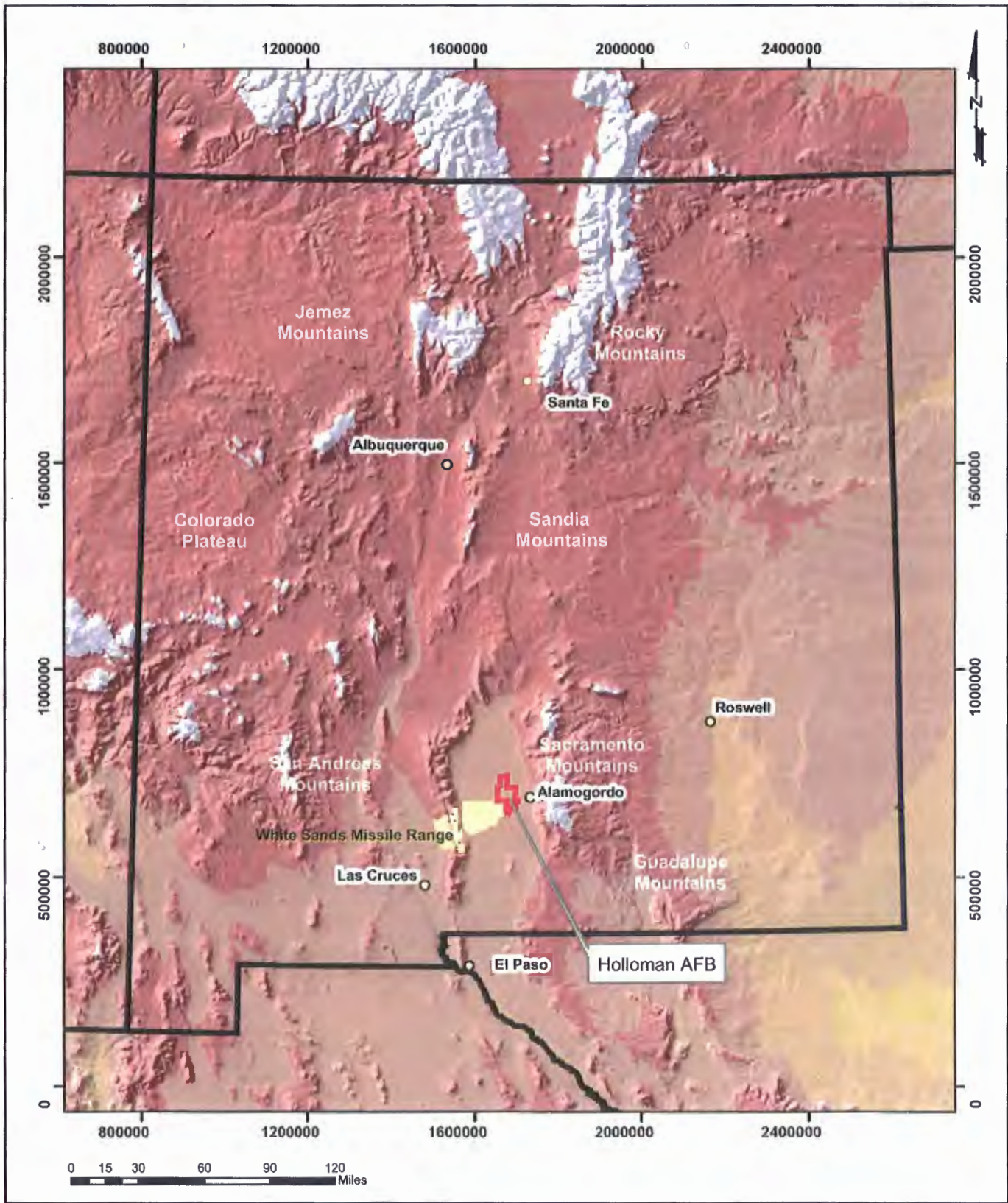
## **B. FACILITY DESCRIPTION**

HAFB is situated in south central New Mexico, in the northwest central part of Otero County, approximately 75 miles north-north-east of El Paso, Texas (**Figure 1**). HAFB has a population of 6,000 and occupies about 50,000 acres in the northeast quarter of Section 1, Township 17 South, Range 8 East. The White Sands Missile Range testing facilities occupy additional land extending northward from the Base. Private and public owned lands border the remainder of HAFB. The major highway servicing HAFB is Highway 70, which runs southwest from the town of Alamogordo and separates HAFB from publicly owned lands to the south. Alamogordo which has a population of approximately 35,000 is located approximately 7 miles east of the base.

HAFB was first established in 1942 as Alamogordo Army Air Field (AAF). From 1942 through 1945, Alamogordo AAF served as the training grounds for over 20 different flight groups, flying primarily B-17s, B-24s, and B-29s. After World War II, most operations had ceased at the base. In 1947, Air Material Command announced the air field would be its primary site for the testing and development of un-manned aircraft, guided missiles, and other research programs. On January 13, 1948, the Alamogordo installation was renamed Holloman Air Force Base, in honor of the late Col. George V. Holloman; a pioneer in guided missile research. In 1968, the 49<sup>th</sup> Tactical Fighter Wing arrived at HAFB and has remained since. Today, HAFB also serves as the training center for the German Air Force's Tactical Training Center.

Holloman AFB is located within the Sacramento Mountains Physiographic Province on the western edge of the Sacramento Mountains. HAFB is approximately 59,600 acres in area, and is located at a mean elevation of 4,093 feet above mean sea level (amsl). The region is characterized by high tablelands with rolling summit plains; cuesta-formed mountains dipping eastward and of west-facing escarpments with the wide bracketed basin forming the basin and range complex. The Base is located in the Tularosa Sub-basin which is part of the Central Closed Basins. The bordering mountains rise abruptly to altitudes of 7,000 to 12,000 feet amsl. The San Andres Mountains bound the basin to the west (about 30 miles) with the Sacramento Mountains approximately 10 miles to the east. At its widest, the basin is about 60 miles east to west and stretches approximately 150 miles north to south.





### Holloman AFB Location Map

Statement of Basis 2007  
10 SWMUs  
Holloman AFB, NM

PROJECT NO.	SCALE	DATE	DRAWN BY:
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			Figure 1

Figure 1

The Tularosa Basin contains all of the surface flow in its boundaries. The nearest inflow of surface waters to the Base comes from the Lost River, located in the north-central region of the Base. The upper reaches of the Three Rivers and the Sacramento River are perennial in the basin. HAFB is dissected by several southwest trending arroyos that control the surface drainage. Hay Draw arroyo is located in the far north. Malone and Rita's Draw, which drain into the Lost River and Dillard Draw arroyos, are located along the eastern perimeter of the Base. Approximately 10,000 years ago, indications are of a much wetter climate. The present day Lake Otero encompassed a much larger area, possibly upwards of several hundred square miles. Its remains are the Alkali Flat and Lake Lucero. Lake Lucero is a temporary feature of merely a few inches in depth during the rainy season.

Ancient lakes and streams deposited water bearing deposits over the older bedrock basement material. Fractures, cracks, and fissures in the Permian and Pennsylvanian bedrock yield small quantities of relatively good quality water in the deeper peripheral. Potable water is only found from wells near the edges of the basin with more saline water towards the center. Two of the principal sources of potable water are a long narrow area on the upslope sides of Tularosa and Alamogordo with the other in the far southwestern part of the basin. A portion of Alamogordo's water, as well as the Base's, is supplied from Lake Bonito (which is in the Pecos River Basin).

The sedimentary rocks which make up the adjacent mountain ranges are between 500 and 250 million years old. During the period when the area was submerged under the shallow intra-continental sea, the layers of limestone, shale, gypsum, and sandstone were deposited. In time, these layers were pushed upward through various tectonic forces forming a large bulge on the surface. Approximately 10 million years ago the center began to subside resulting in a vertical drop of thousands of feet leaving the edges still standing (the present day Sacramento and San Andres mountain ranges). In the millions of years following, rainfall, snowmelt, and wind eroded the mountain sediments depositing them in the valley (i.e. Tularosa Basin). Water carrying eroded gypsum, limestone, dolomite, gravel, and other alluvial matter continues to flow into the basin with no route of exit.

The Tularosa Sub-basin is geologically described as a bolson, which is an extensive flat alluvium-floored depression, into which drainage from the surrounding mountains flows toward a central playa. The overlying alluvium generally consists of unconsolidated gravels (limestone, dolomite, and gypsum), sands, and clays. A fining sequence from the San Andreas and Sacramento Ranges towards the basin's center characterizes the area with the near surface soils as alluvial, eolian, and lacustrine deposits. The alluvial fan deposits are laterally discontinuous units of interbedded sand, silt, and clay while the eolian deposits consist primarily of gypsum sands. The eolian and alluvial deposits are usually indistinguishable due to the reworking of the alluvial sediment by eolian



processes. The playa, or lacustrine deposits, consist of silty clay containing gypsum and are contiguous with the alluvial fan and eolian deposits.

The predominance of the groundwater occurs as an unconfined aquifer in the unconsolidated deposits of the central basin, with the primary source of recharge as rainfall percolation and minor amounts of stream run-off along the western edge of the Sacramento Mountains. Surface water/rainfall migrates downward into the alluvial sediments at the edge of the shallow aquifer near the ranges, and flows downgradient through progressively finer-grained sediments towards the central basin. Because the Tularosa Basin is a closed system, water that enters the area only leaves either through evaporation or percolation. This elevated amount of percolation results in a fairly high water table. Beneath HAFB, groundwater ranges from 5 to 50 feet. Flow for the Base is generally towards the southwest with localized influences from the variations in the topography of the Base. Near the arroyos, groundwater flows directly toward the surface drainage feature.

Groundwater quality in the Tularosa Basin is of potable quality at the recharge areas in close proximity to the Sacramento Mountains and becomes increasingly mineralized toward the central portion of the basin and discharge areas (Radian, 1993). The majority (over 70 %) of the Environmental Restoration Program (ERP) Sites / SWMUs / Areas of Concern (AOCs) located across HAFB, have groundwater monitoring wells containing water with an average total dissolved solids (TDS) concentration greater than 10,000 milligrams per liter (mg/L). This TDS data supports the hypothesis that TDS concentrations below 10,000 mg/L at Holloman AFB are caused by dilution of natural groundwater from leaking water lines and surface irrigation from the domestic water supply. TDS concentrations greater than 10,000 mg/L exceed the New Mexico Water Quality Control Commission (NMWQCC) limit as potable water and thus, the groundwater beneath HAFB has been designated as unfit for human consumption. Likewise, U.S. Environmental Protection Agency (USEPA) guidelines have identified the groundwater as a Class IIIB water source, characterized by TDS concentrations exceeding 10,000 mg/L.

In addition, there are no potable water wells on HAFB. Potable water for the base and the city of Alamogordo is derived from the nearby Sacramento Mountains. The only production water well, used for livestock irrigation, is located approximately 12 miles southwest of Spill Site SS-61.

As a whole, New Mexico has a mild, arid to semi-arid continental climate characterized by light precipitation totals; abundant sunshine, relatively low humidity and relatively large annual and diurnal temperature range. The climate of the Central Closed Basins varies with elevation. The Base is found in the low areas and is characterized by warm temperatures and dry air. Daytime temperatures often exceed 100 degrees Fahrenheit (°F) in the summer months and middle 50s in the winter. A preponderance of clear skies and relatively low humidity permits rapid night time cooling resulting in average

diurnal temperature ranges of 25 to 35°F. Potential evapotranspiration, at 67 inches per year, significantly exceeds annual precipitation, usually less than 10 inches. The very low rainfall amounts resulting in the arid conditions, which with the topographically induced wind patterns combining with the sparse vegetation, tend to cause localized "dust devils". Much of the precipitation falls during the mid-summer monsoonal period (July and August) as brief, yet frequent, intense thunderstorms culminating to 30 – 40% of the annual total rainfall.

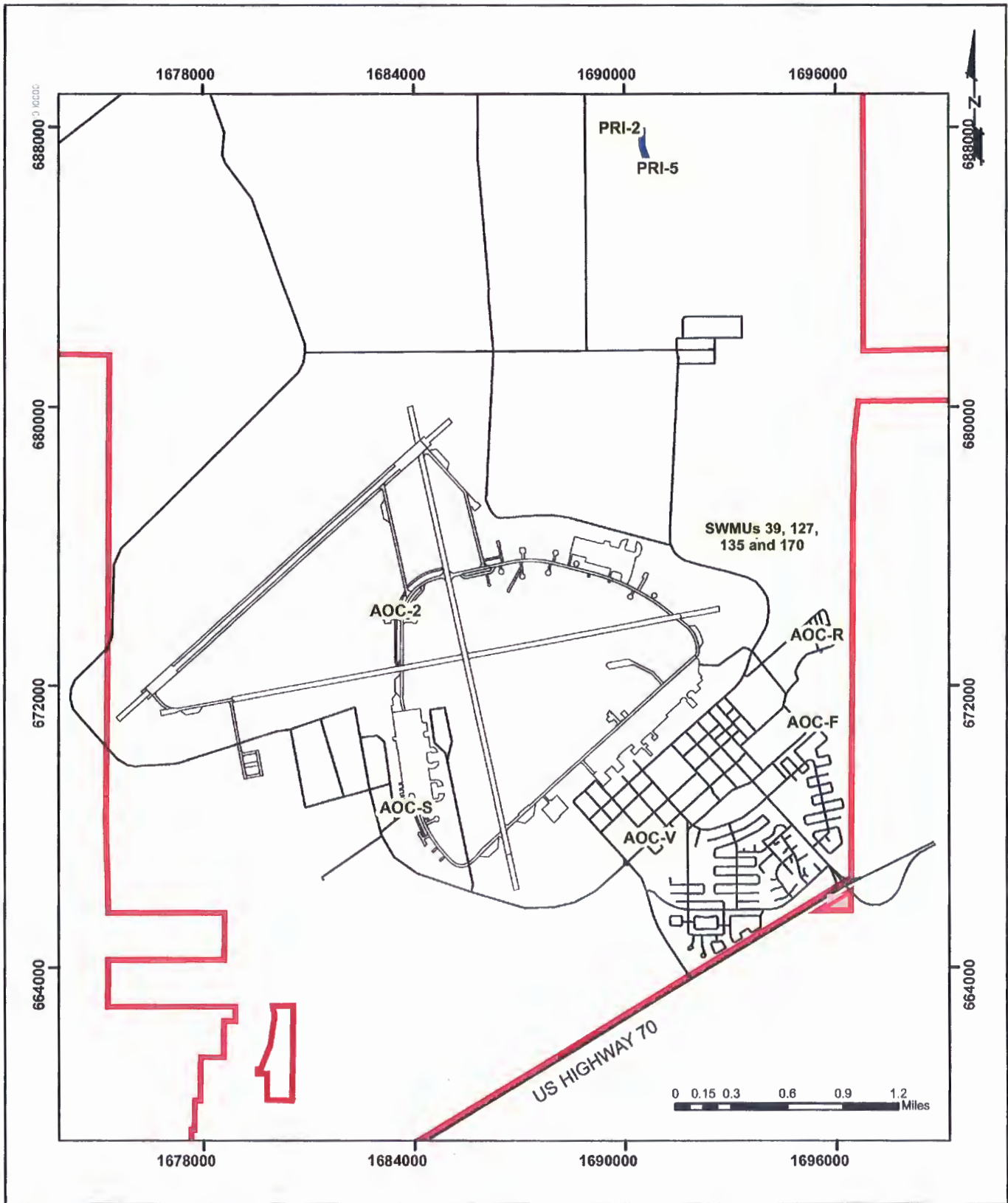
### C. HISTORY OF INVESTIGATION

At HAFB, investigation and remediation of SWMUs is conducted under both the Air Force's ERP and the RCRA Corrective Action Program. The ERP program [formerly the Installation Restoration Program (IRP)] was initiated in 1983 and the RCRA Facility Assessment (RFA) was conducted in 1987. A RCRA Permit and the HSWA module was issued to HAFB in 1991 and became effective on September 25, 1991. Since the permit became effective, investigations and remediation of SWMUs and AOCs at the Base have been conducted under the RCRA Facility Investigation (RFI) and Corrective Action (CA) guidelines. Table A of Appendix 4-A of the Base RCRA Facility Permit identifies SWMUs and AOCs at the Base requiring CA. Table B of Appendix 4-A of the Base RCRA Facility Permit contains SWMUs and AOCs not currently requiring CA. Initially, approximately 236 potential SWMUs and 29 AOCs were listed on Table A. Currently, 62 sites remain on Table A. The remaining sites have been transferred through this process to Table B.

This document has been prepared to provide NMED with the basis for removing an additional 10 SWMUs and AOCs from the Base permit. **Figure 2** is a general map of the Base illustrating the locations of the ERP sites and SWMUs listed in this Statement of Basis.

### D. INVESTIGATION RESULTS

The 2005 Statement of Basis resulted in the removal of seven sites from Table A of the RCRA permit. Since, the previous Statement of Basis, additional sites have undergone remediation or corrective action as directed by NMED. At present, 10 sites have been identified for No Further Action (NFA). Section J of this document contains a brief description of each of each site, the actions performed, the basis for removal from the permit, and relevant references concerning the site.



Base Map with the Locations  
of SWMUs for NFA

PROJECT NO.	SCALE	DATE	DRAWN BY:
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Statement of Basis 2007  
10 SWMUs  
Holloman AFB, NM

Figure 2



## **E. PERMIT MODIFICATION**

The administrative record for this proposed action consists of a legal notice, fact sheet, the NMED Statement of Basis for removal, the request for Permit Modification, related correspondence, documents, and the modified permit. The administrative record may be reviewed during normal business hours at:

New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303  
Mr. John Kieling

(505) 428-2535

The legal notice, fact sheet, the NMED Statement of Basis, and modified permit may also be reviewed at:

Public Library of Alamogordo  
920 Oregon Street  
Alamogordo, New Mexico 883310

## **F. SELECTED REMEDY**

The NMED determination that NFA is required at these SWMUs is based on sampling and analytical data, field surveys, documentation of remediation, historical records, aerial photographs, and employee interviews regarding operations at these sites. The determination for permit removal is based one or more of the following criteria:

- NFA Criterion 1: The SWMU/AOC cannot be located, does not exist or is a duplicate SWMU/AOC.
- NFA Criterion 2: The SWMU/AOC has never been used for the management (i.e. generation, treatment, storage and/or disposal) of RCRA solid waste or hazardous waste and/or constituents, or other Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances.
- NFA Criterion 3: No release to the environment has occurred or is likely to occur in the future from the SWMU/AOC
- NFA Criterion 4: A release from the SWMU/AOC to the environment has occurred, but the SWMU/AOC was characterized and/or remediated under

another authority (such as the NMED Petroleum Storage Tank, Solid Waste, or Groundwater Quality Bureaus).

NFA Criterion 5: The SWMU/AOC has been characterized or remediated in accordance with current applicable State or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Each site eligible for NFA is summarized in **Table 1**.

**Table 1. List of SWMUs Proposed for NFA by Criteria**

<b>SWMU No.</b>	<b>SWMU Title</b>	<b>ERP Site No.</b>	<b>NFA Criteria No.</b>
AOC-F	Asphalt Tank Spill Area	SS-68	1
PRI-2 & PRI-5	Spent Solvent Disposal Area	OT-35	5
SWMU 39 SWMU 127 SWMU 135 SWMU 170	Former Fire Training Area	FT-31	5
AOC-2	Sewage Disposal Area Taxiway G	AOC-2	5
AOC-R	JP-4 Fuel Line Spill Site	SS-06	5
AOC-V	Officer's Club	SS-57	5
AOC-S	Hospital Underground Storage Tank (UST)	HUST	5

## **G. PUBLIC PARTICIPATION**

Requirements for public notification by the New Mexico Hazardous Waste Regulations include public notice in a local newspaper and sending notices to all persons on the facility mailing list maintained by the NMED. The notice announces the 60-day comment period for the request for permit modification. The notice indicates the date, time, and place for a public meeting. Also, the notice will provide a contact person and address for submitting written comments on the permit modification. Upon review of the request for permit modification, a list of SWMUs that NMED deems appropriate for NFA must be published in a local newspaper and public notices must be sent to all persons on the facility mailing list. As part of this process, the public may make comments to and/or request additional information from NMED.

## **H. FURTHER STEPS**

The public meeting will be scheduled and notices will be posted/published as indicated in Section G. The NMED will notify all persons on the mailing list concerning the location, time, and date of the public meeting and the contact person for public written comment. When the comment period has passed and the public meeting has been conducted, the NMED will notify HAFB and each person on the public comment mailing list of the final decision. The final decision will become effective 30 days after service of the decision, unless a later date is specified or Public Hearing is requested in accordance with New Mexico Hazardous Waste Management Regulations, 20 New Mexico Administrative Code (NMAC) 4.1, Section 901. F. *Hearings*.

## **I. CONTACT PERSON FOR ADDITIONAL INFORMATION**

Mr. John Kieling, Manager  
Permits Management Program  
New Mexico Environment Department, Hazardous Waste Bureau  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303  
(505) 428-2535 telephone  
(505) 428 2567 Fax

**OR**

Mr. Cornelius Amindyas  
New Mexico Environment Department  
550 San Antonio Drive NE  
Albuquerque, New Mexico 87109  
(505) 222-9543 telephone  
(505) 222-9510 Fax

## J. DESCRIPTIONS OF SWMUs PROPOSED FOR NO FURTHER ACTION

### J.1 SWMU (AOC-F), Asphalt Tank Spill Area (ERP Site SS-68)

#### Location

SWMU AOC-F is identified in the ERP as site SS-68, Asphalt Tank Spill Area. The 1988 RFA states that aboveground and belowground tanks were previously removed and were located to the northwest of Building 121. The December 2005 *HAFB Environmental Restoration Program Site Status Summaries Report* places the location as 200 feet northeast of Creosote Avenue. This location coincides with the current piles of asphalt that are gathered from road work across the Base and recycled. While the exact location is unknown, the most likely location of these tanks (if they ever existed) would have been at the location used to stockpile and recycle asphalt pavement. A detailed layout of this site and its surroundings is provided as **Figures 3 and 4**.

#### Evaluation of Relevant Information

The records searched to obtain information on AOC-F include:

- Aerial photographs taken in 1984, 1996, and 2004
- The 1988 RFA prepared by A.T. Kearney, Inc. dated September 1988
- Site visit on July 10, 2006
- HAFB Environmental Restoration Program Site Status Summaries Report (December 2005)
- Interview with Mr. Darvin St. John of the HAFB 49<sup>th</sup> CES/CEV Environmental Flight

Weathered asphalt removed from road improvement projects at HAFB has been crushed and reused since the 1980s. Typically, after it has been removed, the asphalt has been staged in an undeveloped area east of Creosote Avenue and north of the base enlisted personnel housing. Normally the asphalt is staged in piles until it is reused. This has been standard practice since the early 1980s. A tank has not been observed in the aerial photographs of the area taken in 1984, 1996, and 2004. Further, asphalt tanks are typically heated to keep the material warm and flowable for use and that would make underground tanks unlikely for this kind of operation at HAFB.