



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

ENTERED

JUN 20 2008

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT

Attn: Mr. James Bearzi
Hazardous Waste Bureau
2905 Rodeo Park Drive East
Santa Fe NM 87105-6303



FROM: 49 CES/CD
550 Tabosa Ave
Holloman AFB NM 88330-8458

Subject: Formal Request for a Class 3 Permit Modification of Holloman Air Force Base (AFB)
RCRA Permit No. NM6572124422

1. In accordance with 40 CFR §270.42(c) as incorporated by the New Mexico (NM) Hazardous Waste Management Regulations, 20.4.1.900 NMAC, Holloman AFB (HAFB) is requesting a Class 3 permit modification of the HAFB Resource Conservation and Recovery Act (RCRA) Permit No. NM6572124422. Specifically, HAFB is requesting No Further Action (NFA)/corrective action complete status for five Solid Waste Management Units (SWMUs) and three areas of concern (AOCs), and the transfer of the eight sites from permit Appendix 4.A Table A (SWMUs/AOCs Requiring Corrective Action) to Appendix 4.A Table B (SWMUs/AOCs Not Requiring Corrective Action). The eight RCRA sites, along with corresponding AF Environmental Restoration Program (ERP) designations, associated with this Class 3 permit modification request are:

- SWMU 105 (ERP designation LF-19) – Golf Course Landfill;
- SWMU 108 (ERP designation LF-23) – Mobile Support Squadron (MOBSS) Landfill;
- SWMU 115 (ERP designation LF-22) – West Area Landfill No. 1;
- SWMU 116 (ERP designation LF-21) – West Area Landfill No. 2;
- SWMU 130 (ERP designation SS-46) – Taxiway 3 Tank 28 JP-4 Underground Waste Tank;
- AOC P (ERP designation OT-44) – Building 301 Fuel Tank Leaks;
- AOC S (ERP designation SS-46) – Leaking UST; and
- AOC N (ERP designation SS-48) – Military Gas Station.

Since the late 1980s to early 1990s, HAFB has been investigating and remediating, when needed, the eight RCRA sites listed above. A summary of the investigations conducted and associated analytical results are provided for NM Environment Department (NMED) review in the Fact Sheet/Statement of Basis at Atch 1. Based upon the data collected, HAFB requested NFA/corrective action complete status for SWMU 105 under NMED Criterion 3 and SWMUs 108, 115, 116, and 130, and AOCs N, P, and S under NMED Criterion 5. The NMED reviewed the various investigation reports associated with these RCRA sites and has concurred with the conclusions of these reports that the eight sites are suitable for NFA/corrective action complete status. This modification is needed to transfer the eight sites from permit Appendix 4.A Table A to permit Appendix 4.A Table B.

In accordance with 40 CFR §270.42(c)(2), HAFB has submitted notice of this modification request to all persons on the current HAFB mailing list as maintained by NMED, and to all appropriate units of State and local government as specified in 40 CFR §124.10(c)(ix). HAFB has also published this notice in the *Alamogordo Daily News* on 20 June 2008, and submitting this letter within seven days of this modification request as specified in 40 CFR §270.42(c)(2). Evidence of this mailing and publication is at Atch 2 of this letter. The notice and mailing provided the information specified in 40 CFR §270.42(c)(2)(i) through 40 CFR §270.42(c)(2)(vi), as evidenced by Attachment A.

Consistent with the notice and in accordance with 40 CFR §270.42(c)(3), HAFB has placed a copy of the permit modification request and attached Fact Sheet/Statement of Basis for review/copying at the following location during the public comment period:

Alamogordo Public Library

920 Oregon Avenue

Alamogordo, NM 88330

Telephone: (575) 439-4140

Summer Hours: Monday-Thursday, 10:00 am – 8:00 pm, Friday 10:00 am – 5:00 pm, Saturday 11:00 am – 5:00 pm, and Sunday 1:00 pm – 5:00 pm.

<http://ci.alamogordo.nm.us/coa/communityservices/library.htm>

The 60-day comment period required by 40 CFR §270.42(c)(5) began with publication of the notice (20 June) and will extend through 5:00 PM on 19 August 2008. Consistent with the notice and pursuant to 40 CFR §270.42(c)(4), a public meeting is scheduled for 8 July 2008 at the Sgt Willie Estrada Civic Center in Alamogordo, NM. This date is within the timeframe specified in 40 CFR §270.42(c)(4).

2. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

3. If you have any questions, please feel free to contact Mr. David Scruggs at (575) 572-5395.



A. DAVID BUDAK
Deputy Base Civil Engineer

Attachments:

1. Permit Modification Fact Sheet/Statement of Basis
2. Publication Notice from the *Alamogordo Daily News*, 20 June 2008

cc: (See next page)

cc: (w/Atchs)

Mr. Davis Strasser
Hazardous Waste Bureau
5500 San Antonio Dr. NE
Albuquerque NM 87109

Mr. Will Moats
Hazardous Waste Bureau
5500 San Antonio Dr. NE
Albuquerque NM 87109

Mr. Bob Sturdivant
USEPA, region 6 (6PD-F)
1445 Ross Ave., Ste 12
Dallas TX 75202-2733

Mr. John Kieling, Program Manager
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505

Holloman Air Force Base (HAFB) hereby notifies the public that it is initiating a Class 3 Modification to its Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act (RCRA) Permit # NM6572124422. The request is for the removal of five Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs) from Table A (active portion) of the permit to Table B (inactive portion) as approved for No Further Action.

For each SWMU or AOC, the rationale for no further action designation has been documented in a No Further Action (NFA) proposal termed a "Statement of Basis." The New Mexico Environment Department (NMED) is currently reviewing the NFA Statement of Basis.

HAFB requests that the eight (8) SWMUs/AOCs, identified in the table below, be designated as no further action approved (Corrective Action Complete) in the Tables under Appendix 4-A of the Corrective Action Permit Part 4.

Identification of SWMUs and AOCs Proposed for Designation as Corrective Action Complete (No Further Action Approved)

SWMU/AOC No.	SWMU Title	ERP Site No.
SWMU 105	Golf Course Landfill	LF-19
SWMU 116	West Area Landfill No. 2	LF-21
SWMU 115	West Area Landfill No. 1	LF-22
SWMU 108	Mobile Support Squadron (MOBSS) Landfill	LF-23
AOC P	Building 301 Fuel Tank Leaks	OT-44
AOC S and SWMU 130	Leaking UST and Taxiway 3 Tank 28 JP-4 Underground Waste Tank	SS-46
AOC N	Military Gas Station	SS-48

AOC = Area of Concern.
ERP = Environmental Restoration Program
SWMU = Solid Waste Management Unit.

Comment Period. A 60-day public comment period has been initiated with the publication of this notice. Comments on this request for permit modification will be accepted through 19 August 2008. Comments should be directed to:

Mr. David Scruggs
Environmental Flight
49 CES/CEV
550 Taboša Avenue, Holloman AFB, NM 88330-8277

AND

John E. Kieling, Program Manager
Hazardous Waste Bureau - New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303
Ref: Holloman AFB- Permit Modification July 2008

Public Meeting. Each of the eight SWMUs/AOCs proposed for No Further Action will be presented in a poster format, and Holloman AFB staff will be available to answer questions. The meeting will be conducted as an open house, with posters available for individual review at any time throughout the two hour time period. The meeting will be held on 8 July 2008, from 6:00 to 8:00 pm at the Willie Estrada Civic Center, 800 East 1st Street, Alamogordo, NM 88330.

Holloman AFB Contact. Questions may be directed to Mr. David Scruggs, (575) 572-5395.

New Mexico Environment Department Contact. Questions may be directed to John Kieling, (505) 476-6035.

Public Inspection of Documents. A copy of the request for permit modification and supporting documentation is available for public inspection at the Alamogordo Public Library, 920 Oregon Avenue, Alamogordo, NM 88330.

Compliance History. The permittee's compliance history during the life of the permit being modified is available from the NMED contact person.

LIBRARY COPY

**FACT SHEET/STATEMENT OF BASIS
FOR APPROVAL
OF
NO FURTHER ACTION FOR
EIGHT SOLID WASTE MANAGEMENT UNITS
AND AREAS OF CONCERN
RCRA PERMIT No. NM6572124422
HOLLOMAN AIR FORCE BASE
NEW MEXICO**



**Air Force Center for Engineering and the Environment
Brooks City-Base, Texas**

June 2008



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OF
NO FURTHER ACTION FOR
EIGHT SOLID WASTE MANAGEMENT UNITS AND
AREAS OF CONCERN
RCRA PERMIT No. NM6572124422
HOLLOMAN AIR FORCE BASE
NEW MEXICO**

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Prime Contract No. FA4890-06-D-0009

June 2008

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**FACT SHEET/STATEMENT OF BASIS FOR APPROVAL
OF
NO FURTHER ACTION FOR
EIGHT SOLID WASTE MANAGEMENT UNITS AND
AREAS OF CONCERN**

RCRA PERMIT No. NM6572124422

**HOLLOMAN AIR FORCE BASE
NEW MEXICO**

June 2008

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LIST OF ACRONYMS, SYMBOLS, AND ABBREVIATIONS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
AFB	Air Force Base
AOC	area of concern
bgs	below ground surface
Bhate	Bhate Environmental Associates, Inc.
BN/AE	base, neutral, and acid extractable
BRA	baseline risk assessment
BTEX	benzene, toluene, ethylbenzene, and total xylenes
COPC	chemical of potential concern
CRDL	contract required detection limit
DRO	diesel-range organic
EPA	United States Environmental Protection Agency
ERP	Environmental Restoration Program
GRO	gasoline-range organic
HGL	HydroGeoLogic, Inc.
HSWA	Hazardous and Solid Waste Amendments
IDL	Instrument Detection Limit
IRP	Installation Restoration Program
LTM	long term monitoring
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MOBSS	Mobility Support Squadron
MTBE	methyl tertiary butyl ether
NAPL	non-aqueous phase liquid
NFA	no further action
NMED	New Mexico Environment Department
NMGWQ	New Mexico Groundwater Quality
NMRBDM	New Mexico Risk Based Decision Making
NOD	notice of deficiency
PCB	polychlorinated biphenyl

LIST OF ACRONYMS, SYMBOLS, AND ABBREVIATIONS (continued)

Radian	Radian Corporation, Inc.
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SSL	Soil Screening Level
SWMU	solid waste management unit
TAL	target analyte list
TCE	trichloroethene
TDS	total dissolved solid
TOC	total organic carbon
TOX	total organic halide
TPH	total petroleum hydrocarbon
TRPH	total recoverable petroleum hydrocarbons
UST	underground storage tank
VOC	volatile organic compound
yd ³	cubic yard(s)

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SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
RCRA PERMIT NO. NM6572124422
HOLLOMAN AIR FORCE BASE
NEW MEXICO**

INTRODUCTION

Under authority of the New Mexico Hazardous Waste Act (Section 74-4-1 et seq., NMSA 1978, as amended, 1992) and the New Mexico Hazardous Waste Management Regulations [20.4.1 New Mexico Administrative Code (NMAC)], the New Mexico Environment Department (NMED) can approve or deny hazardous waste permits, closure plans, permit modifications, and amendments. A Class 3 permit modification request was submitted to NMED on June 23, 2008 by the U.S. Air Force for Holloman Air Force Base (AFB) Hazardous Waste Facility Resource Conservation and Recovery Act (RCRA) Permit No. NM6572124422 (Permit) pursuant to 20.4.1.900 NMAC (incorporating 40 CFR §270.42 (c)). If approved, the permit modification request would grant no further action (NFA) status for five Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs), and modify Part 4 of the Permit to move these SWMUs and AOCs from Appendix 4-A Table A (SWMUs Requiring Corrective Action) to Appendix 4-A Table B (Table B (SWMUs/AOCs Not Requiring Corrective Action)).

Investigation and remediation of SWMUs and AOCs at Holloman AFB is conducted under both the Air Force Environmental Restoration Program (ERP) and RCRA Corrective Action Program. The following sites, with SWMU/AOC designations and corresponding ERP Site designations, are the subject of this proposed permit modification:

SWMU/AOC No.	SWMU Title	ERP Site No.
SWMU 105	Golf Course Landfill	LF-19
SWMU 116	West Area Landfill No. 2	LF-21
SWMU 115	West Area Landfill No. 1	LF-22
SWMU 108	Mobility Support Squadron (MOBSS) Landfill	LF-23
AOC P	Building 301 Fuel Tank Leaks	OT-44
AOC S and SWMU 130	Leaking Underground Storage Tank and Taxiway 3 Tank 28 JP-4 Underground Waste Tank	SS-46
AOC N	Military Gas Station	SS-48

The Permittee's primary contact for this action is Ms. Debbie Hartell, 49 CES/CEV, 550 Tabosa Avenue, Holloman AFB, New Mexico, 88330.

A. FACILITY DESCRIPTION

Holloman AFB is situated in south-central New Mexico, in the northwest-central part of Otero County. The Base occupies about 50,000 acres in the northeast quarter of section Township 17 South, Range 8 East. Additional land extending northward is occupied by the White Sands Missile Range testing facilities. A facility location map is included as Figure A1. The locations of the subject sites are shown on Figure A2.

The Base is located about 75 miles northeast of El Paso, Texas, and about 7 miles west of Alamogordo, New Mexico. Alamogordo is the county seat of Otero County, and the only town of appreciable size within 30 to 50 miles of the Base. The population of Alamogordo was 23,535 in 1975, and has since grown to about 31,000. The economy of Alamogordo depends largely upon Holloman AFB and other military installations in the area. Approximately 5,500 people live at Holloman AFB.

Currently, Holloman AFB hosts the Air Combat Command 49th Fighter Wing, the mission of which includes pilot training, mobility support, and combat support operations. The primary Air Force Materiel Command component located at Holloman AFB is the 46th Test Group, which is responsible for evaluation of propulsion and navigational systems for aircraft, space vehicles, and missiles. A variety of tenant organizations are assigned to Holloman AFB, including the German Air Force Tornado Squadron, the 4th Space Surveillance Squadron, and Detachment 4 of the 55th Weather Squadron.

B. HISTORY OF ENVIRONMENTAL COMPLIANCE

Investigation and remediation of SWMUs and AOCs at Holloman AFB is conducted under both the Air Force ERP and the RCRA Corrective Action Program. The ERP, formerly called the Installation Restoration Program (IRP), was initiated in 1983 and the RCRA Facility Assessment (RFA) was conducted in 1987. A Hazardous and Solid Waste Amendments (HSWA) permit was issued to Holloman AFB in 1991 and became effective on September 25, 1991. In January 1996, NMED received authorization from the United States Environmental Protection Agency (EPA) for corrective action under the HSWA and became the administrative authority for this action. The HSWA portion of the RCRA permit identified sites at the Base requiring a Remedial Investigation (RI)/RCRA Facility Investigation (RFI). RFI activities were conducted in two phases. The Phase I RFI was conducted between 1987 and 1992; Phase II of the RFI was conducted between 1992 and 1995. A total of 236 potential SWMUs and 29 AOCs were investigated. Additionally, five remote sites such as radar sites, well fields, and reservoirs were investigated under the RFI. A total of 265 sites were identified and investigated during this process. At the completion of the RFI and RFA processes and through the use of decision documents, 119 SWMUs and AOCs remained on the RCRA permit.

In 1999, Holloman AFB submitted a request to remove 104 SWMUs and AOCs from the RCRA permit. In February 2000, NMED determined that 69 of the 104 SWMUs and AOCs were considered appropriate for removal. A detailed document describing conditions at these sites and the basis for removal was submitted to NMED in October 2000. In February 2001, NMED granted a Class III Permit Modification to remove 69 sites from the Base RCRA Permit. On November 29, 2005, an additional seven sites—six SWMUs and one AOC—were approved for NFA status and re-located from Appendix 4-A Table A to Appendix 4-A Table B.

Section H below briefly describes the location, history, evaluation of relevant information, and the basis for determination for each SWMU and AOC proposed for NFA. More detailed descriptions of the particulars for each SWMU and AOC can be found in the accompanying references constituting the Administrative Record.

This Statement of Basis describes the five SWMUs and three AOCs for which NMED concurred that NFA was required. In summary, if NMED approves the Permittee's request for a permit modification, these eight sites will be removed from Appendix 4-A Table A (SWMUs Requiring Corrective Action) to Appendix 4-A Table B (SWMUs/AOCs Not Requiring Corrective Action).

C. ADMINISTRATIVE RECORD

The Administrative Record for this proposed action consists of the Holloman AFB Permit Modification Request, this Fact Sheet/Statement of Basis, the Public Notice, the Draft Permit consisting of revised Tables 4-A and 4-B, and the referenced supporting documentation for each site. References for this Statement of Basis are listed in each site-specific section in Section H, below. The complete Administrative Record may be reviewed at the following location during the public comment period:

NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone: (505) 476-6000
Monday-Friday: 8:00 am – 5:00 pm

A copy of this Fact Sheet/Statement of Basis, the Public Notice, and the Draft Permit consisting of revised Tables 4-A and 4-B may be reviewed at the following location during the public comment period:

Alamogordo Public Library
920 Oregon Avenue
Alamogordo, New Mexico 88330
Telephone: (575) 439-4140
Summer Hours: Monday-Thursday, 10:00 am – 8:00 pm, Friday 10:00 am – 5:00 pm, Saturday 11:00 am – 5:00 pm, Sunday 1:00 pm – 5:00 pm.
<http://ci.alamogordo.nm.us/coa/communityservices/library.htm>

D. PUBLIC PARTICIPATION

Holloman AFB issued a public notice on June 20, 2008 to announce the beginning of a 60-day comment period on the Permit modification request that will end at August 19, 2008, 5:00 pm. Any person who wishes to comment on this action or request a public hearing should submit written or electronic mail (e-mail) comment(s) with the commenter's name and address to the address below. Only comments and/or requests received on or before August 19, 2008, 5:00 pm will be considered. A public meeting arranged by the Permittee will be held on July 8, 2008 in Alamogordo in accordance with NMAC 20.4.1.901 as part of the 60-day public comment period on the permit modification request required by the regulations at 40 CFR §270.42(c)(5).

John E. Kieling, Program Manager
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Ref: Holloman AFB No Further Action Petition
E-mail: john.kieling@state.nm.us
Telephone: (505) 476-6035
Fax: (505) 476-6030

Written comments must be based on the Administrative Record (for example, this Fact Sheet/Statement of Basis). Documents in the Administrative Record need not be re-submitted if expressly referenced by the commenter. Requests for a public hearing shall provide: (1) a clear and concise factual statement of the nature and scope of the interest of the person requesting the hearing; (2) the name and address of all persons whom the requestor represents; (3) a statement of any objections to the proposed action, including specific references; and (4) a statement of the issues that such persons proposes to raise for consideration at the hearing. Written comment and requests for Public Hearing must be filed with Mr. John Kieling at the address above on or before August 19, 2008, 5:00 pm. NMED will provide a 30-day notice of a public hearing, if scheduled.

E. NEXT STEPS

NMED will notify Holloman AFB 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 review is requested in accordance with NMAC 20.4.1.901.

F. CONTACT PERSON FOR ADDITIONAL INFORMATION

For additional information, contact the following individual:

John E. Kieling, Program Manager
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
E-mail: john.kieling@state.nm.us
Telephone: (505) 476-6035
Fax: (505) 476-6030

G. NFA CRITERIA

The sites addressed herein have been under investigation since the early 1990s. Based on the information collected, NMED has concurred that the sites qualify for NFA. NFA requests were based on one of the five NMED NFA criteria presented below:

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

Fact Sheet/Statement of Basis for Approval of No Further Action for Eight SWMUs and AOCs

hazardous waste and/or constituents, or other hazardous substances controlled under the Comprehensive Environmental Response, Compensation, and Liability Act.

- 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.

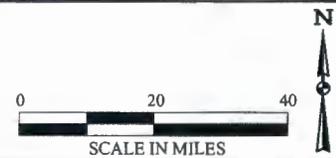
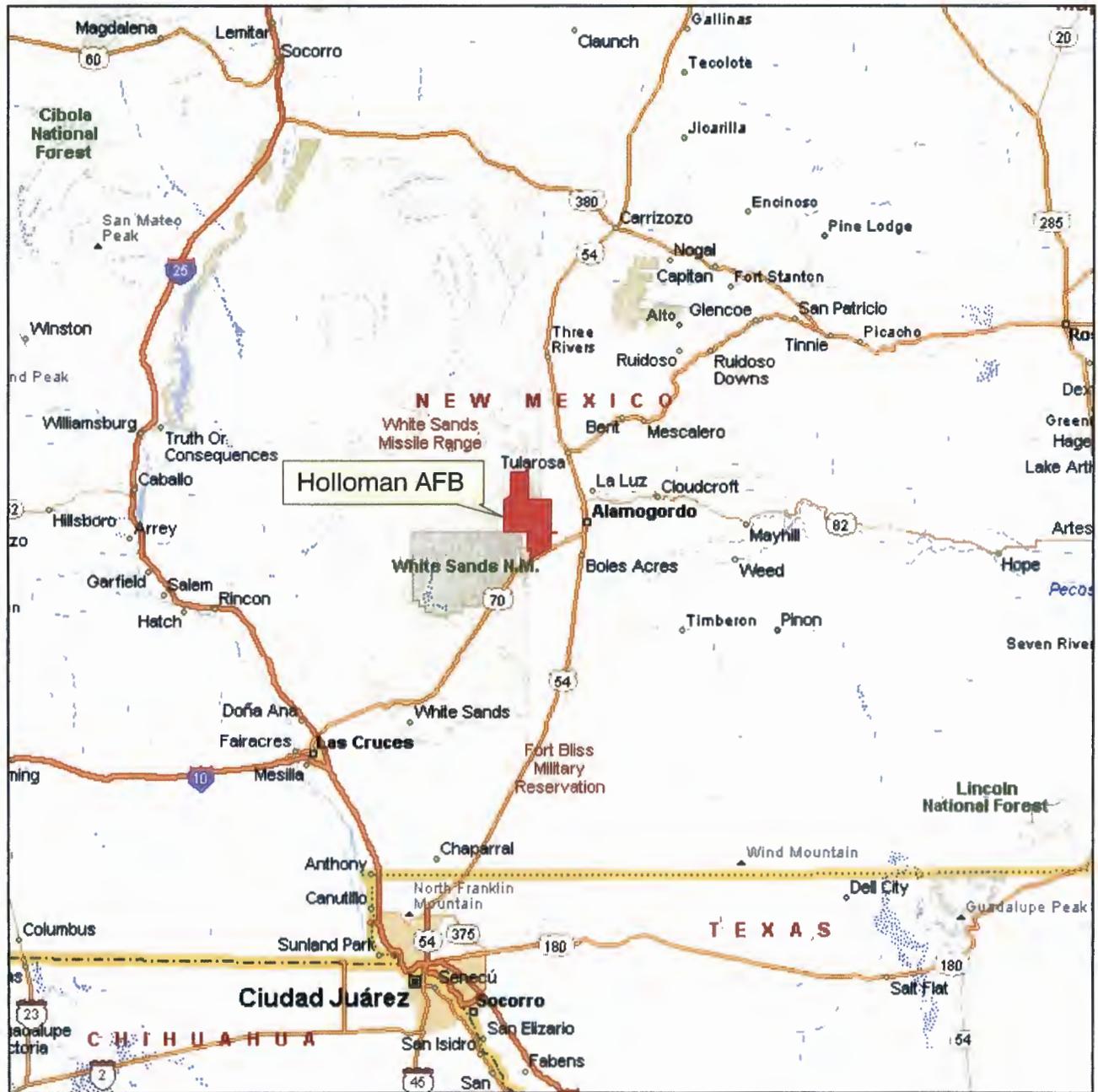
The NFA criteria for the subject sites are identified in the table below:

SWMU/AOC No.	SWMU Title	ERP Site No.	NFA Criterion No.
SWMU 105	Golf Course Landfill	LF-19	3
SWMU 116	West Area Landfill No. 2	LF-21	5
SWMU 115	West Area Landfill No. 1	LF-22	5
SWMU 108	MOBSS Landfill	LF-23	5
AOC P	Building 301 Fuel Tank Leaks	OT-44	5
AOC S and SWMU 130	Leaking Underground Storage Tank and Taxiway 3 Tank 28 JP-4 Underground Waste Tank	SS-46	5
AOC N	Military Gas Station	SS-48	5

SWMU = solid waste management unit
AOC = area of concern
MOBSS = Mobility Support Squadron
UST = underground storage tank
ERP = Environmental Restoration Program
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act

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FIGURES

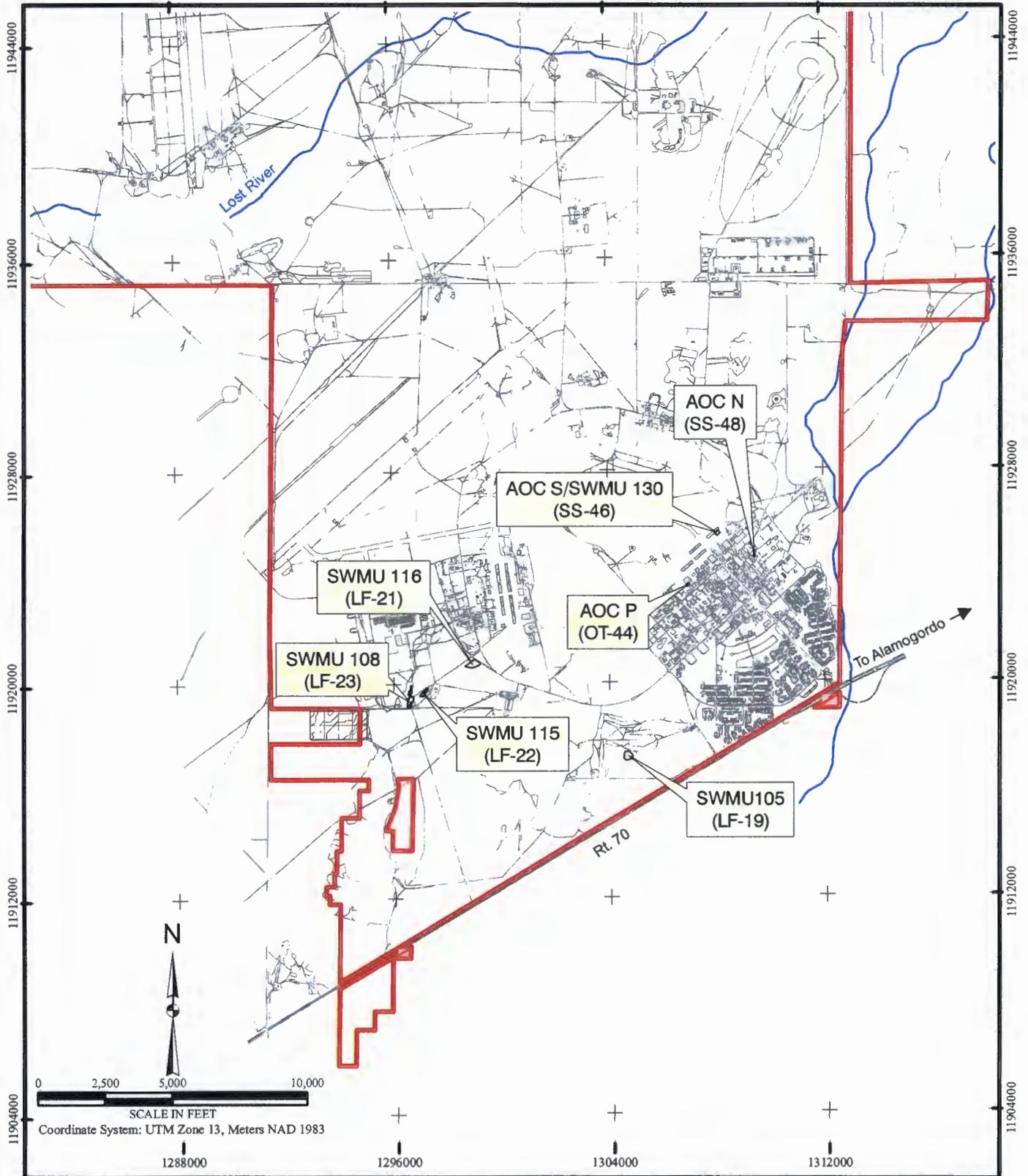


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 \TO37\SOB_7_Sites\Site_location.cdr
 Project: TT3001.02.01
 Revised: 04/04/08 TB
 Source: MapPoint



Figure A.1
Facility Location Map
Holloman AFB

Holloman AFB Fact Sheet/Statement of Basis



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Project: TT3001.02.01
Revised: 04/04/08 TB
Map Source: Holloman AFB



Legend

-  Holloman AFB Boundary
-  Building/Structure
-  Operable Unit Boundary (Approx.)

Figure A.2
Site Location Map
Holloman AFB

H. DESCRIPTION OF SWMUS AND AOCs PROPOSED FOR NFA

H.1 LF-19 (SWMU 105), GOLF COURSE LANDFILL

H.1.1 Location/Unit Description

LF-19, the Golf Course Landfill, is located due south of Fairway 7 of the Holloman AFB golf course and approximately 800 feet north of the southern Base boundary. The location of LF-19 with respect to the surrounding facility is shown on Figure A2. A site layout of LF-19 is provided as Figure H1.1.

LF-19 is approximately two acres in size and encompasses two disposal units (herein designated as the “northern” and “southern” disposal units). The two disposal units are separated by a narrow, shallow, man-made drainage ditch that trends northeast to southwest. Both disposal units are unpaved, primarily undeveloped, and partially vegetated. The largest portion of LF-19 is comprised of the northern disposal unit, which lies immediately south of the golf course. This unit is bounded to the north and northeast by the asphalt-paved golf cart path; to the east by a fenced-in cactus garden, a small salt cedar grove, and an aggregate (i.e., sand) stockpile; to the south by the shallow, man-made drainage ditch; and to the west by undeveloped, moderately vegetated land. The majority of the northern disposal unit is open, unpaved, and primarily clear of vegetation. Vegetation consisting of salt cedars, shrubs, and grasses is located primarily along the periphery of the northern disposal unit. The golf course historically and currently uses the northern disposal unit for the exterior storage of golf course materials and supplies. At the time of the supplemental RFI field investigation, sand and mulch piles, slashed vegetation, and grass clippings were observed. Minor amounts of concrete rubble were present in the southwestern portion of the disposal area, while scrap metal and degraded metallic corrugated piping was present southeast of the unit. The slashed vegetation and grass clippings were present in the southern portion of the disposal unit. The southern disposal unit is located immediately south of the northern disposal unit, across the narrow, shallow, man-made drainage ditch. This disposal unit is characterized primarily by a long, linear, east-west trending mound ranging approximately 2 feet above the surrounding topography, approximately 150 feet south of the man-made drainage ditch. The area between the mound and the drainage ditch is relatively flat, moderately vegetated with shrubs, and criss-crossed by several unpaved service roads. Sporadic amounts of scrap metal were observed on the surface of the mound. North of the mound, the ground was also sporadically littered with scrap metal. To the south of the debris mound, little to no debris was observed.

H.1.2 History/Current and Anticipated Future Land Use

LF-19 was used between 1968 and 1978 as a disposal site for golf course grass clippings; however, the RFA indicated that unused rodenticides may have been disposed at the landfill. No other information has supported the potential disposal of unused rodenticides at LF-19.

The current and anticipated future land use is open space.

H.1.3 Evaluation of Relevant Information

In 1992, a RFI consisting of installing and sampling three groundwater monitoring wells (MW19-01 through MW19-03) was conducted (Radian Corporation, Inc. [Radian], 1994). The locations of the wells in relation to the site are shown on Figure H1.1. The collected

groundwater samples were analyzed for volatile organic compounds (VOCs), organochlorine pesticides, organophosphorus pesticides, polychlorinated biphenyls (PCBs), chlorinated herbicides, total metals, anions, and total dissolved solids (TDS). Table H1.1 presents the RI analytical results screened against the EPA Maximum Contaminant Levels (MCLs) and New Mexico Groundwater Quality (NMGWQ) standards. None of the analytes were detected above background concentrations and EPA MCLs. Cadmium and chloride were the only analytes detected at concentrations exceeding background and NMGWQ standards. No organochlorine pesticides, organophosphorus pesticides, PCBs, or chlorinated herbicides were detected in the groundwater samples and no site-related VOCs were detected. Methylene chloride was detected but was considered a remnant of laboratory blank contamination. Based on the analytical results, the RFI concluded that wastes, if present at LF-19, had not impacted the underlying groundwater and that the site did not present an unacceptable risk even under worst-case exposure conditions.

Based on the results of the RI, Holloman AFB submitted a Decision Document (Radian, 1995) concluding a no-action remedy was appropriate for LF-19. As part of the no-action remedy, surface debris would be removed, a plat of survey would be produced, and groundwater long term monitoring (LTM) would be conducted at the site at the request of NMED and EPA. LTM activities would consist of the biennial collection and analysis of groundwater samples from the three onsite wells for 10 years to ensure that any potential future release from the site would be detected. The collected groundwater samples were to be analyzed for VOCs, organochlorine pesticides, organophosphorus pesticides, chlorinated herbicides, and metals. NMED concurred with and signed the Decision Document.

LTM activities were initiated in 1995. Over the course of the program, the required target analyte list (TAL) was reduced due to lack of analyte detections. By 2003, the required TAL had been reduced to barium, iron, and manganese. With the exception of lead in the first round of sampling, no constituents in the downgradient wells were detected above background concentrations and NMGWQ standards. The TDS concentrations of the groundwater beneath LF-19 exceed 10,000 milligrams per liter (mg/L); indicating that the water is not a potable or agricultural source. The 2003 LTM event marked the fifth biennial sampling event for LF-19. Consequently, within the 2003 LTM report, cessation of LTM and site closeout was recommended [Bhate Environmental Associates (Bhate), 2003]. The groundwater analytical results obtained during 10 years of LTM monitoring and associated EPA MCLs and NMGWQ standards are presented on Table H1.2.

NMED informed Holloman AFB that LTM could be suspended, but that NFA for LF-19 would be considered after additional characterization was performed at the site. Additional characterization activities consisted of a geophysical survey (terrain conductivity and in-phase geophysical survey) and site trenches were conducted in the fall 2005 and spring 2006. The non-invasive geophysical survey conducted on the site and surrounding area confirmed the absence of subsurface metallic anomalies. Magnetic surveying identified a few discrete magnetic anomalies associated with areas containing metallic or magnetically susceptible surface debris. Terrain conductivity results did not suggest the presence of a landfill.

On May 22, 2006, four trenches (designated as HGLTR19-01 through HGLTR19-04) and two test pits (designated as HGLTP19-01 through HGLTP19-02) were completed at LF-19. The trenches were completed within both lobes of the landfill and targeted identified geophysical anomalies and areas of visual interest. The locations of the trenches are depicted on Figure H1.1.

During propagation of trench HGLTR19-01, small bluish crystals were observed around several corroded copper pipe fragments. NMED visually inspected the LF-19 trenches on May 22, 2006, during which NMED was notified of the bluish crystals (Strasser, 2006). After inspecting the trench, NMED approved the collection of two soil samples, one from the area containing the bluish crystals and one from the soil immediately beneath it. The soil samples were analyzed for organochlorine pesticides, organophosphorous pesticides, herbicides, and TAL metals. The location of the two soil samples is depicted on Figure H1.1.

No organochlorine pesticides or herbicides were detected in the two soil samples. Several organophosphorous pesticides were detected in both soil samples with concentrations typically higher in the near surface soil sample (HGLTR19-01-0102). None of the organophosphorous pesticides concentrations detected in the soil samples exceeded NMED soil screening criteria. Elevated copper, aluminum, chromium, and manganese concentrations were detected in HGLTR19-01-0102, the soil sample containing the bluish crystals. The reported copper concentration exceeded the NMED residential soil screening level (SSL). None of the metals detected in sample HGLTR19-01-0203, collected within one foot below sample HGLTR19-01-0102, were detected at concentrations above NMED SSLs. The presence of the bluish crystals only immediately around the copper pipe fragments, the elevated copper concentrations in shallow soil sample HGLTR19-01-0102, and the lack of elevated metal concentrations in the deeper soil sample (HGLTR19-01-0203) supported the conclusion that the observed bluish crystals are a copper salt formed from the corrosion of copper pipe fragments. The soil analytical results are summarized on Table H1.3.

Based on the analytical results, NFA and the transfer of LF-19 from Appendix 4.A Table A to Appendix 4.A Table B based on NMED Criterion 3 was requested within the RFI report [HydroGeoLogic, Inc. (HGL), 2007]. On May 1, 2007, NMED approved the RFI report (NMED, 2007). A copy of the NMED approval letter is provided as Figure H1.2.

H.1.4 Basis for Determination

NMED concurred with the RFI conclusion that SWMU 105 (LF-19) is suitable for NFA based on NMED Criterion 3; no release to the environment has occurred or is likely to occur in the future from the SWMU/AOC.

H.1.5 References

Bhate Environmental Associates, Inc. (Bhate), 2003. Final 2003 Long-Term Groundwater Monitoring Report, Holloman AFB, New Mexico. September.

HydroGeoLogic, Inc. (HGL), 2007. Supplemental RCRA Facility Investigation, LF-19 (SWMU 105), LF-21 (SWMU 116), LF-22 (SWMU 115), and LF-23 (SWMU 108), Holloman Air Force Base, Alamogordo, New Mexico. February.

New Mexico Environment Department (NMED), 2007. Approval of the Supplemental RCRA Facility Investigation Report, LF-19 (SWMU 105), LF-21 (SWMU 116), LF-22 (SWMU 115), and LF-23 (SWMU 108), February 2007, Holloman Air Force Base, EPA ID#NM6572124422, HWB-HAFB-07-003. May 1.

Radian Corporation (Radian), 1992. RI, Report, Volume II of III, Appendices A, B, C, and D, Investigation, Study and Recommendation for 29 Waste Sites.

Radian, 1993. Preliminary Assessment and Site Investigation Report, Investigation of Four Waste Sites, Holloman Air Force Base, New Mexico.

Radian, 1994. Draft Final Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Volume 1, Holloman AFB, New Mexico. October.

Radian, 1995. Decision Documents, Multiple Sites.

Strasser, D., 2006. Personnel communication between Mr. Dave Strasser of NMED and Mr. Brett Brodersen of HGL while conducting an onsite inspection of the LF-19 trenches. The discussion was in regard to the collection of soil samples from trench HGLTR19-01 and associated NMED required analyses. May 22.

TABLES

Table H1.1
Remedial Investigation Groundwater Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico

Analyses	Background¹	EPA MCL	NMGWQ Standard	Detection Limit	MW-19-01 (upgradient)	MW-19-02	MW-19-03
Inorganic Results (mg/L)							
EPA 160.1- Total Dissolved Solids	43,600	--	1,000	10	<i>17,000</i>	<i>21,000</i>	<i>42,000</i>
EPA 300.0- Chloride	19,600	--	250	26	<i>7,200</i>	<i>8,200</i>	20,000
EPA 300.0- Sulfate	7,470	--	600	5.0	<i>3,400</i>	<i>4,600</i>	<i>7,100</i>
EPA 340.2- Fluoride	4.7	4	1.6	0.10	<i>1.7</i>	<i>3.2</i>	<i>1.8</i>
EPA 353.1- Nitrate-Nitrite	98	--	--	0.022	1.2	8.6	5.7
EPA 365.2- Total Phosphorous	0.75	--	--	0.020	0.26	0.5	0.18
SW6010- Metals (µg/L)							
Antimony	89.6	6	--	100	<i>140</i>	140	<i>100</i>
Cadmium	8.3	5	10	5	<i>6.3</i>	<i>5.4</i>	11
Chromium	234	100	50	10	12	17	ND
Nickel	43.6	--	200 [^]	20	32	33	29
Zinc	253.4	--	10,000	20	33	41	< 0.020
SW7421- Lead (µg/L)	19.9	15	50	3	< 0.0030		21
Organic Results							
SW8240 - Volatile Organics (µg/L)							
Methylene Chloride	--	--	100	5.0	3.8 J	< 5.0	22

Note: Table presents only constituents detected in ground water at this site.

EPA = United States Environmental Protection Agency

MCL = Maximum Contaminant Level

NMGWQ = New Mexico Groundwater Quality

mg/L = milligrams per liter

µg/L = micrograms per liter

-- = No value or standard was found

J = Detected below the detection limit.

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values

Results shaded in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and are greater than the background and upgradient values

Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

[^] NMGWQ Standard for Irrigation Use

¹ Source for Inorganics Values is: Radian (1992). Source for Metals is Radian (1993).

Table H1.2
Long Term Groundwater Monitoring Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-19-01 ⁴				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
1,2,3- Trichlorobenzene ⁶	--	--	--	NA	ND	NA	NA	NA
1,2,4- Trichlorobenzene ⁶	--	70	--	NA	ND	NA	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	< 3	NA	NA
Barium	85.2	2000	1000	ND	19	14.5 B (J)	11.3	7.18 J
Cadmium	7.4	5	10	ND	ND	.03 B	NA	NA
Iron	--	--	1000	ND	ND	< 21	89.3	< 200
Lead	5.6	15	50	54	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	230	284 (J)	597 (J)	514
Mercury	0.03	2	2	ND	ND	< 0.2	< 0.5	NA
Selenium	85.3	50	50	ND	ND	2.9 B (J)	NA	NA
Silver	6.7	--	50	ND	ND	< 0.5	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Table H1.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-19-02				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
1,2,3- Trichlorobenzene ⁶	--	--	--	NA	1.7 J	NA	NA	NA
1,2,4- Trichlorobenzene ⁶	--	70	--	NA	0.9 J	NA	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	3.9 B (J)	NA	NA
Barium	85.2	2000	1000	ND	ND	21.6 B (J)	15.2	11.9
Cadmium	7.4	5	10	ND	ND	0.5 B	NA	NA
Iron	--	--	1000	ND	ND	132	< 1000	146 J
Lead	5.6	15	50	540	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	ND	246 (J)	77.5 (J)	79.6
Mercury	0.03	2	2	ND	ND	0.56 (J)	< 0.5	NA
Selenium	85.3	50	50	ND	ND	2.7 B (J)	NA	NA
Silver	6.7	--	50	ND	ND	< 0.5	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Table H1.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-19-03				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
1,2,3- Trichlorobenzene ⁶	--	--	--	NA	ND	NA	NA	NA
1,2,4- Trichlorobenzene ⁶	--	70	--	NA	ND	NA	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	< 3	NA	NA
Barium	85.2	2000	1000	ND	ND	17.8 B (J)	18.8 B	10.6 J
Cadmium	7.4	5	10	ND	ND	< 0.3	NA	NA
Iron	--	--	1000	ND	ND	< 110	< 10,000	< 200
Lead	5.6	15	50	420	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	ND	1.1 B (J)	1.5 B (J)	< 100
Mercury	0.03	2	2	ND	ND	< 0.2	< 0.5	NA
Selenium	85.3	50	50	ND	ND	4.1 B (J)	NA	NA
Silver	6.7	--	50	ND	ND	1.3 B (J)	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Fact Sheet/Statement of Basis for Approval of No Further Action for Eight SWMUs and AOCs
Holloman Air Force Base

Table H1.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico

Notes:

¹ Unless otherwise reported, no VOCs were detected prior to 2001 using EPA Method 8260B.
(EPA Method 8260A was used to analyze for VOCs in the 1995 and 1997 programs.)

Laboratory qualifiers--

² Unless otherwise reported, no metals were detected using EPA Methods 6010B Trace & 7470A.
assigned as a result of internal laboratory data assessment procedures
(EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)

B - Value less than CRDL but greater than or equal to IDL

³ Unless otherwise reported, no organochlorine pesticides were detected prior to 1999 using EPA Method 8081A.

J - estimated value; less than CRDL but greater than or equal to IDL

(EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)

UB - Qualifies as non-detect due to presence of analyte in associated laboratory blank

⁴ Upgradient monitoring well

EPA Qualifiers--assigned as a result of independent data validation

CRDL = Contract Required Detection Limit

(J) - Estimated value

IDL = Instrument Detection Limit

(UJ) - Estimated value below the reporting limit

NA = not analyzed

(U) Compound was analyzed for but not detected.

ND = not detected at or above method reporting limit

2003 Validation Qualifiers

VOC = volatile organic compound

J - Estimated value detected less than the CRDL but greater than the reporting limit.

µg/L = micrograms per liter

U - Compound was analyzed for but not detected. Analyte result was below the CRDL.

-- = No value or standard was found

UJ - Estimated as a non-detect at the detection limit.

SWMU = solid waste management unit

AFB = Air Force Base

NM = New Mexico

EPA = United States Environmental Protection Agency

NMGWQ = New Mexico Groundwater Quality

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values

Results shaded in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and are greater than the background and upgradient values

Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

^ Radian (1993)

**Table H1.3
Soil Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico**

Analyte	NMED Soil Screening Levels, June 2006			HGLTR19-01-0102	HGLTR19-01-0203
	Revision 4.0 Table A-1			1-2'	2-3'
	Residential Soil	Indust/Occup Soil	Const Worker Soil	5/22/2006	5/22/2006
Chlorinated Herbicides (µg/kg)				ND	ND
Organophosphorous Pesticides (µg/kg)				ND	ND
Organochlorine Pesticides (µg/kg)					
alpha-Chlordane	16,200 ⁽¹⁾	71,900 ⁽¹⁾	130,000 ⁽¹⁾	119	2.90
gamma-Chlordane	16,200 ⁽¹⁾	71,900 ⁽¹⁾	130,000 ⁽¹⁾	144	2.00
p,p-DDE	17,200	78,100	570,000	51.6	--
p,p-DDT	17,200	78,100	138,000	7.00	1.90
Endosulfan I	367,000 ⁽²⁾	4,100,000 ⁽²⁾	1,400,000 ⁽²⁾	93.2	--
Endosulfan sulfate	367,000 ⁽²⁾	4,100,000 ⁽²⁾	1,400,000 ⁽²⁾	6.10	--
Endrin aldehyde	18,300 ⁽³⁾	205,000 ⁽³⁾	69,900 ⁽³⁾	105	1.00
Metals (mg/kg)					
Aluminum	77,800	100,000	14,400	58,300	1,200
Antimony	31.3	454	124	3.64	J --
Arsenic	3.9	17.7	85.2	3.17	1.88
Barium	15,600	100,000	60,200	16.4	17.4
Calcium	NA	NA	NA	28,700	156,000
Chromium	234 ⁽⁴⁾	3,400 ⁽⁴⁾	26.1⁽⁴⁾	78.6	0.976 J
Cobalt	1,520	20,500	61.0	3.47	0.695 J
Copper	3,130	45,400	12,400	7,870	20
Iron	23,500	100,000	92,900	4,060	1,240
Lead	400	800	800	367	7.37
Magnesium	NA	NA	NA	8,640	2,250
Manganese	3,590	48,400	150	480	17.5
Nickel	1,560	22,700	6,190	310	1.21 J

Fact Sheet/Statement of Basis for Approval of No Further Action for Eight SWMUs and AOCs
Holloman Air Force Base

**Table H1.3 (continued)
Soil Analytical Results
LF-19 (SWMU 105)
Holloman AFB, New Mexico**

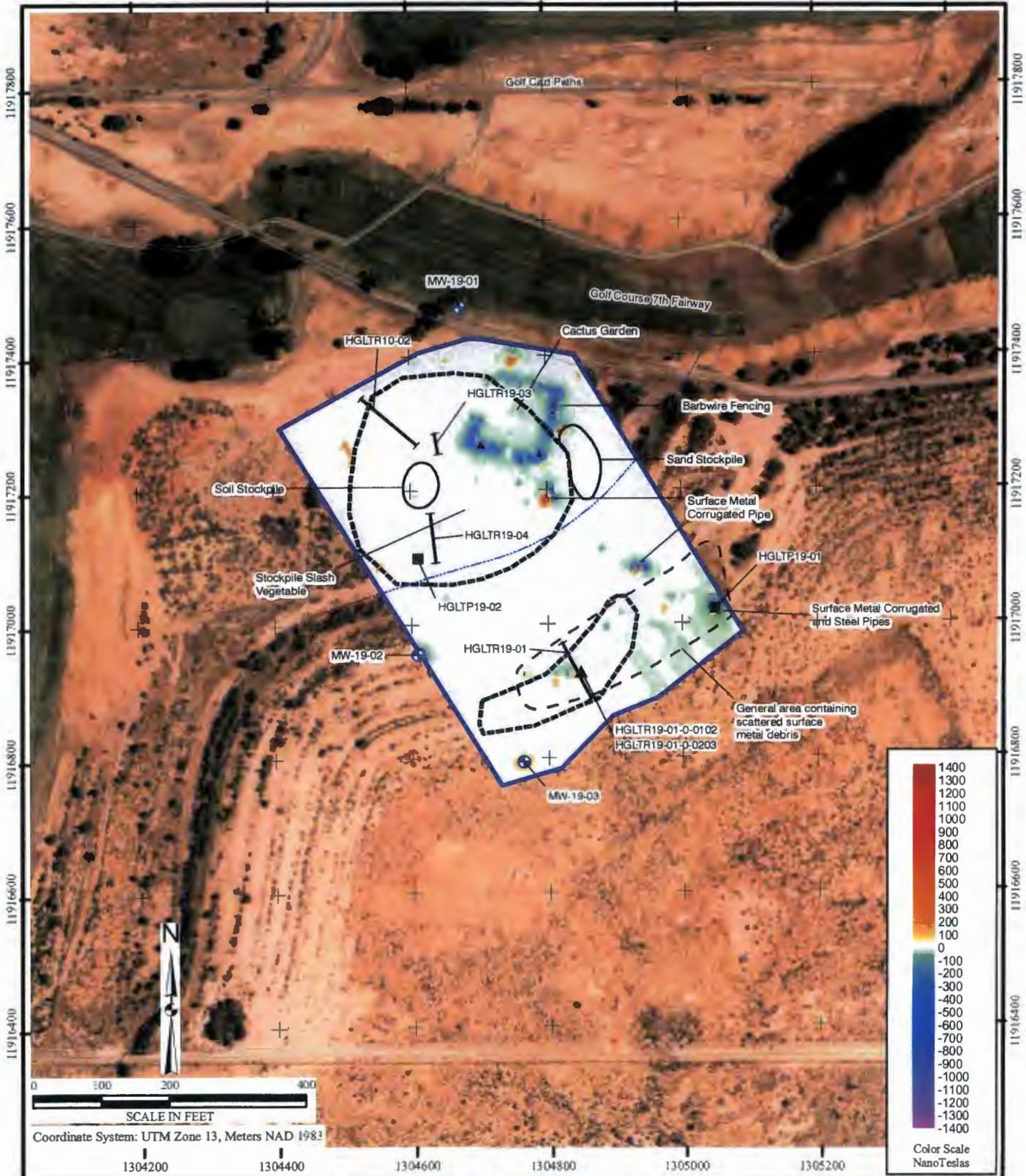
Analyte	NMED Soil Screening Levels, June 2006			HGLTR19-01-0102	HGLTR19-01-0203
	Revision 4.0 Table A-1			1-2'	2-3'
	Residential Soil	Indust/Occup Soil	Const Worker Soil	5/22/2006	5/22/2006
Potassium	NA	NA	NA	1,240	619
Silver	391	5,680	1,550	4.26	--
Sodium	NA	NA	NA	9,280	3,020
Vanadium	78.2	1,140	310	15.4	2.19 J
Zinc	23,500	100,000	92,900	2,040	5.16

- (1) Chlordane NMED SSL value used as surrogate for alpha-chlordane and gamma-chlordane
- (2) Endosulfan NMED SSL value used as surrogate for endosulfan I and endosulfan sulfate
- (3) Endrin NMED SSL value used as a surrogate for endrin aldehyde
- (4) Hexavalent chromium NMED SSL value used as a surrogate for chromium

µg/kg = micrograms per kilogram
 mg/kg = milligrams per kilogram
 NMED = New Mexico Environment Department
 SSL = soil screening level

Gray shaded and **bolded** analyte concentrations indicate analyte concentrations above one or more screening criteria values
Bolded screening criteria values are those values exceeded by an analyte concentration

FIGURES



File X:\AFC002\Holloman_AFB\TO37\Maps\
 SOB_7_Sites\LF-19_Trench.mxd
 Project: TT3001.02.01
 Revised: 04/04/08 TB
 Map Source: Holloman AFB



- Legend**
- Monitoring Well
 - Test Pit
 - ▲ Soil Sample
 - Operable Unit Boundary (Base GIS)
 - Magnetic Survey Boundary
 - - - Drainage Swale
 - Trench

Figure H1.1
LF-19 (SWMU 105)
Site Layout
Holloman AFB



BILL RICHARDSON
GOVERNOR

State of New Mexico
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2905 Rodeo Park Drive East, Building 1
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Ms. Debbie Hartell
May 1, 2007
Page 2 of 2

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W. Moats, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HWB
D. Tellez, EPA Region 6 (6PD-F)
File: HAFB 2007 and Reading

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

May 1, 2007

Ms. Debbie Hartell, Chief
Environmental Flight
49th CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

RE: APPROVAL OF THE SUPPLEMENTAL RCRA FACILITY INVESTIGATION
REPORT, LF-19 (SWMU 105), LF-21 (SWMU 116), LF-22 (SWLU 115) AND LF-
23 (SWMU 108), FEBRUARY 2007
HOLLOMAN AIR FORCE BASE, EPA ID #NM6572124422
HWB-HAFB-07-003

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed Holloman Air Force Base's Supplemental RCRA Facility Investigation Report, dated February 2007. The referenced Report is hereby approved by NMED.

If you have any questions regarding this matter, please contact David Strasser of my staff at (505) 222-9526 or at the above letterhead address.

Sincerely,


John E. Kieling
Manager
Permits Management Program
JEK: dcs

Holloman AFB Fact Sheet/Statement of Basis

Figure H1.2
NMED Approval Letter
May 1, 2007
Holloman AFB

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Project: TT3001.02.01
Revised: 04/04/08 TH



H.2 LF-21 (SWMU 116), WEST AREA LANDFILL NO. 2

H.2.1 Location/Unit Description

LF-21, the West Area Landfill No. 2, is located east of the Solar Observatory (Building 910), in the southwestern corner of the intersection of Observatory Road and Forty-Niner Avenue. The location of LF-21 with respect to the surrounding facility is shown on Figure A.2. A site layout of LF-21 is provided as Figure H2.1. LF-21 is an undeveloped, slightly to moderately vegetated parcel of land approximately three acres in size. The site is unpaved, and vegetation, consisting primarily of salt cedars and shrubs, is present in shallow depressions and around/within small debris mounds. The thickest concentration of vegetation is present along the northern and eastern site boundaries. The site is bounded to the northwest by Observatory Road, to the northeast by Forty-Niner Avenue, and to the southwest and southeast by undeveloped land. Access to LF-21 is unrestricted. A large, green-painted, metallic storage box and several fox holes constructed of sand bags are present in the western portion of LF-21. The presence of the storage box and the fox holes indicates that LF-21 has been used and possibly continues to be used for military training exercises. Although the north-central portion of the unit is clear of vegetation, no defined service roads (paved or unpaved) have been observed at the site. Debris consisting of a mixture of concrete and asphalt rubble, terra cotta pipe fragments, metal piping, green and white colored PVC pipes, a wood door, metal cables, and rebar is present on the surface in discrete piles located throughout LF-21. The debris occurs primarily in distinct mounds that are typically less than one foot above the grade of the surrounding topography.

H.2.2 History/Current and Anticipated Future Land Use

LF-21 was reportedly used to dispose of paper bags, food, cans, boxes, boards, and tree limbs from the early 1970s to 1977. According to one interviewee during the records search, some 55-gallon drums were also observed during the active period of disposal. Disposal at this site ceased after the site was identified as an unapproved landfill.

The current and anticipated future land use is industrial.

H.2.3 Evaluation of Relevant Information

In 1992, a RI consisting of installing and sampling four groundwater monitoring wells (MW21-01 through MW21-04) was conducted at LF-21 (Radian, 1994). The monitoring wells were installed up-slope (MW21-01) and downslope (MW21-02 through MW21-04) of the former landfill (Figure H2.1). The groundwater samples were analyzed for VOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, chlorinated herbicides, total metals, anions, and TDS. Table H2.1 presents the RI groundwater analytical results screened against EPA MCLs and NMGWQ standards. No organochlorine pesticides, organophosphorus pesticides, PCBs, or chlorinated herbicides were detected in the groundwater samples. Several VOCs were detected; however, all of the VOCs were detected at concentrations below screening criteria. Cadmium was the only analyte detected hydraulically downgradient of the site at a concentration [24 micrograms per liter ($\mu\text{g/L}$) in MW21-02] that exceeded both the background concentration and the NMGWQ standard of 10 $\mu\text{g/L}$.

Based on the results of the RI, Holloman AFB submitted a Decision Document (Radian, 1995) concluding a no-action remedy was appropriate for LF-21. As part of the no-action remedy, surface debris would be removed, a plat of survey would be produced, and groundwater LTM would be conducted at the site at the request of NMED and EPA. LTM activities would consist of the biennial collection and analysis of groundwater samples from the three onsite wells for 10 years to ensure that any potential future release from the site would be detected. NMED concurred with and signed the Decision Document.

LTM activities were initiated in 1995. The results of the LTM sampling events are summarized on Table H2.2. Over the course of the program, the required analyte list was reduced until, by 2003, the required analyte list included only barium, iron, and manganese. With the exception of iron in MW21-04 (September 2001), no constituents in the downgradient wells were detected above background concentrations and NMGWQ standards. In accordance with the Decision Document and given the lack of analytes above screening criteria, cessation of LTM activities and site closeout was recommended (Bhate, 2003).

NMED informed Holloman AFB that additional characterization of the landfill would be required before NFA status would be considered and that LTM could not be suspended due to the presence of trichloroethene (TCE) in MW21-01, the upgradient monitoring well. LTM activities were therefore conducted in 2005. The required analyte list for the 2005 LTM event was increased to include VOCs, TAL metals, pesticides, herbicides, and TDS. The results of the sampling event were consistent with previous events except for an elevated manganese concentration within MW21-02 exceeding the NMGWQ standard (200 µg/L). The TDS concentrations of the groundwater beneath LF-21 exceed 10,000 mg/L, indicating that the water is not a potable or agricultural source. Based on the results of the 2005 LTM event and pending the results of additional characterization activities being conducted, the cessation of LTM activities was recommended (Bhate, 2006).

Additional characterization activities, consisting of a geophysical survey and site trenching, were conducted in 2005 and 2006. The geophysical survey included both a terrain conductivity and magnetic in-phase survey. Terrain conductivity results did not imply the presence of a landfill. The magnetic in-phase survey identified a few discrete magnetic anomalies associated with areas containing metallic or magnetically susceptible debris in the surface soils and confirmed the absence of subsurface metallic anomalies. On May 18 and 19, 2006, three trenches (designated as HGLTR21-01 through HGLTR21-03) and four test pits (designated as HGLTP21-01 through HGLTP21-04) were completed at LF-21 to investigate the identified anomalies. The trenches/test pits were completed to maximum depths ranging from 4 to 6 feet below ground surface (bgs) and ranged from 50 feet (HGLTR21-01) to 114 feet in length (HGLTR21-03). During a visual inspection of the sites proposed for trenching, construction debris (i.e., concrete and asphalt rubble, scrap metal, plastic piping, and a wooden door) was observed scattered across the surface of all three areas to be trenched. No hazardous materials, contaminated soils, unusual solids or fluids, or hazardous material storage containers were observed during LF-21 trenching activities based on visual inspection and photoionization detector field screening results. Consequently, no soil samples were collected for laboratory analysis.

Based on the findings of the additional characterization, the RFI recommended NFA under NMED Criterion 5 and the transfer of LF-21 from Appendix 4.A Table A to Appendix 4.A

Table B of the RCRA permit. On May 1, 2007, NMED approved the RFI report (NMED, 2007). A copy of the approval letter is provided as Figure H1.2.

H.2.4 Basis for Determination

NMED concurred with the RFI conclusion that SWMU 116 (LF-21) is suitable for NFA based on NMED 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.

H.2.5 References

Bhate Environmental Associates, Inc. (Bhate), 2003. Final 2003 Long-Term Groundwater Monitoring Report, Holloman AFB, New Mexico. September.

Bhate, 2006. Final 2005 Long-Term Groundwater Monitoring Report, Holloman AFB, New Mexico. May.

New Mexico Environment Department (NMED), 2007. Approval of the Supplemental RCRA Facility Investigation Report, LF-19 (SWMU 105), LF-21 (SWMU 116), LF-22 (SWMU 115), and LF-23 (SWMU 108), February 2007, Holloman Air Force Base, EPA ID#NM6572124422, HWB-HAFB-07-003. May 1.

Radian Corporation (Radian), 1992. RI, Report, Volume II of III, Appendices A, B, C, and D, Investigation, Study and Recommendation for 29 Waste Sites.

Radian, 1993. Preliminary Assessment and Site Investigation Report, Investigation of Four Waste Sites, Holloman Air Force Base, New Mexico.

Radian, 1994. Draft Final Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Volume 1, Holloman AFB, New Mexico. October.

Radian, 1995. Decision Documents, Multiple Sites.

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TABLES

Table H2.1
Remedial Investigation Groundwater Analytical Results
LF-21 (SWMU 116)
Holloman AFB, New Mexico

Analyses	Background ¹	EPA MCL	NMGWQ Standard	Detection Limit	MW-21-01 (upgradient)	MW-21-02	MW-21-03	MW-21-04
Inorganic Results (mg/L)								
EPA 160.1- Total Dissolved Solids	43,600	--	1,000	10	<i>12,000</i>	<i>26,000</i>	<i>27,000</i>	<i>27,000</i>
EPA 300.0- Chloride	19,600	--	250	26	<i>1,900</i>	<i>4,700</i>	<i>7,400</i>	<i>2,500</i>
EPA 300.0- Sulfate	7,470	--	600	5.0	<i>3,000</i>	<i>2,500</i>	<i>2,600</i>	<i>2,400</i>
EPA 340.2- Fluoride	4.7	4	1.6	0.10	2.8	1.7	1.5	1.6
EPA 353.1- Nitrate-Nitrite	98	--	--	0.22	18	18	14	10
EPA 365.2- Total Phosphorous	0.75	--	--	0.020	0.13	0.24	0.15	0.2
SW6010- Metals (µg/L)								
Arsenic	72.3	10	100	8	110	<8	<8	<8
Cadmium	8.3	5	10	20	<20	24	<20	<20
Lead	19.9	15	50	6	<6	6.8	7.2	13
Organic Results								
SW8240 - Volatile Organics (µg/L)								
Benzene	--	5	10	5	<5.0	<5.0	1.4 J	<5.0
Ethylbenzene	--	700	750	5	<5.0	<5.0	1.5 J	<5.0
Methylene chloride	--	--	100	5	4.2 JB	11 B	3.7 JB	1.7 JB
Styrene	--	100	--	5	<5.0	<5.0	2.4 J	<5.0
Toluene	--	1,000	750	5	<5.0	<5.0	4.4 J	<5.0
Xylenes	--	10,000	620	5.0	<5.0	<5.0	2.9 J	<5.0

Note: Table presents only constituents detected in ground water at this site.

EPA = United States Environmental Protection Agency
SWMU = solid waste management unit
mg/L = milligrams per liter
J = Positive detected below the detection limit.
JB = Positive detection below the method detection limit and considered a result of laboratory blank contamination

MCL = Maximum Contaminant Level
AFB = Air Force Base
µg/L = micrograms per liter
B = Positive detection considered a result of laboratory blank contamination

NMGWQ = New Mexico Groundwater Quality
NM = New Mexico
-- = No value or standard was found

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values
Results shaded in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and are greater than the background and upgradient values
Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels
^ NMGWQ Standard for Irrigation Use

¹ Source for Inorganics Values is: Radian (1992). Source for Metals is Radian (1993).

Table H2.2
Long Term Groundwater Monitoring Analytical Results
LF-21 (SWMU 116)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-21-01 ⁴				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	ND	ND	NA
cis-1,2-dichloroethene	--	70	--	ND	ND	ND	ND	NA
Methylene chloride	--	--	100	ND	5.1 UB	< 3	NA	NA
Trichloroethylene	--	5	100	ND	5.4	11	13	15
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	16.2 B (J)	11.8 (J)	21.2
Barium	85.2	2,000	1,000	ND	17	18.6 B (J)	NA	15.7
Cadmium	7.4	5	10	ND	ND	< .03	NA	NA
Chromium	7.2	100	50	ND	ND	9.3 B (J)	< 20	NA
Iron	--	--	1,000	ND	ND	< 21	< 1,000	< 200
Manganese	--	--	200	ND	ND	21.1 B (J)	139 (J)	12.3
Selenium	85.3	50	50	ND	ND	6.2 B (J)	NA	< 10
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Table H2.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-21 (SWMU 116)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-21-02				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	ND	ND	NA
cis-1,2-dichloroethene	--	70	--	ND	ND	ND	ND	NA
Methylene chloride	--	--	100	ND	5 UB	< 3	NA	NA
Trichloroethylene	--	5	100	ND	ND	< 3	< 5	< 1
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	13.0 B (J)	7.2 B (J)	< 100
Barium	85.2	2,000	1,000	ND	40	32.1 B (J)	NA	19.5 J
Cadmium	7.4	5	10	ND	ND	0.3 B	NA	NA
Chromium	7.2	100	50	ND	ND	< 0.6	< 20	NA
Iron	--	--	1,000	ND	ND	< 21	< 1,000	< 200
Manganese	--	--	200	ND	ND	0.6 B (J)	< 10 (UJ)	< 100
Selenium	85.3	50	50	ND	ND	11.3 B (J)	NA	< 100
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Table H2.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-21 (SWMU 116)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-21-03				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	ND	ND	NA
cis-1,2-dichloroethene	--	70	--	ND	ND	ND	ND	NA
Methylene chloride	--	--	100	ND	5.4 UB	< 3	NA	NA
Trichloroethylene	--	5	100	ND	ND	< 3	< 5	< 1
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	11.6 B (J)	12 (J)	16.1
Barium	85.2	2,000	1,000	ND	36	36.1 B (J)	NA	26.8
Cadmium	7.4	5	10	ND	ND	0.6 B	NA	NA
Chromium	7.2	100	50	ND	ND	< 0.6	< 20	NA
Iron	--	--	1,000	ND	ND	< 21	< 1,000	67.4 J
Manganese	--	--	200	ND	50	34.8 (J)	42.1 (J)	19.2
Selenium	85.3	50	50	ND	ND	12.4 B (J)	NA	13.4 J
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Table H2.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-21 (SWMU 116)
Holloman AFB, New Mexico

Well Number	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-21-04				
Sampling Data				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	ND	ND	NA
cis-1,2-dichloroethene	--	70	--	ND	ND	ND	ND	NA
Methylene chloride	--	--	100	ND	4.7 UB	< 3	NA	NA
Trichloroethylene	--	5	100	ND	ND	< 3	< 5	< 1
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	4.6 B (J)	6.7 B (J)	11.8
Barium	85.2	2,000	1,000	ND	38	37.1 B (J)	NA	24.7
Cadmium	7.4	5	10	ND	ND	0.7 B	NA	NA
Chromium	7.2	100	50	ND	ND	< 0.6	< 200	NA
Iron	--	--	1,000	ND	600	936	3440 B	89.2 J
Manganese	--	--	200	ND	ND	78.5 (J)	62.5 (J)	18.6
Selenium	85.3	50	50	ND	ND	11.5 B (J)	NA	12.6 J
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁴ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA

Table H2.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-21 (SWMU 116)
Holloman AFB, New Mexico

Notes:

- ¹ Unless otherwise reported, no VOCs were detected prior to 2001 using EPA Method 8260B. (EPA Method 8260A was used to analyze for VOCs in the 1995 and 1997 programs.)
- ² Unless otherwise reported, no metals were detected using EPA Methods 6010B Trace & 7470A. (EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)
- ³ Unless otherwise reported, no organochlorine pesticides were detected prior to 1999 using EPA Method 8081A. (EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)
- ⁴ Upgradient monitoring well
- CRDL = Contract Required Detection Limit
 IDL = Instrument Detection Limit
 NA = not analyzed
 ND = not detected at or above method reporting limit
 -- no value or standard was found
 VOC = volatile organic compound
 µg/L = micrograms per liter
 EPA = U.S. Environmental Protection Agency
 SWMU = solid waste management unit
 AFB = Air Force Base
 NM = New Mexico
 MCL = Maximum Contaminant Level
 NMGWQ = New Mexico Groundwater Quality

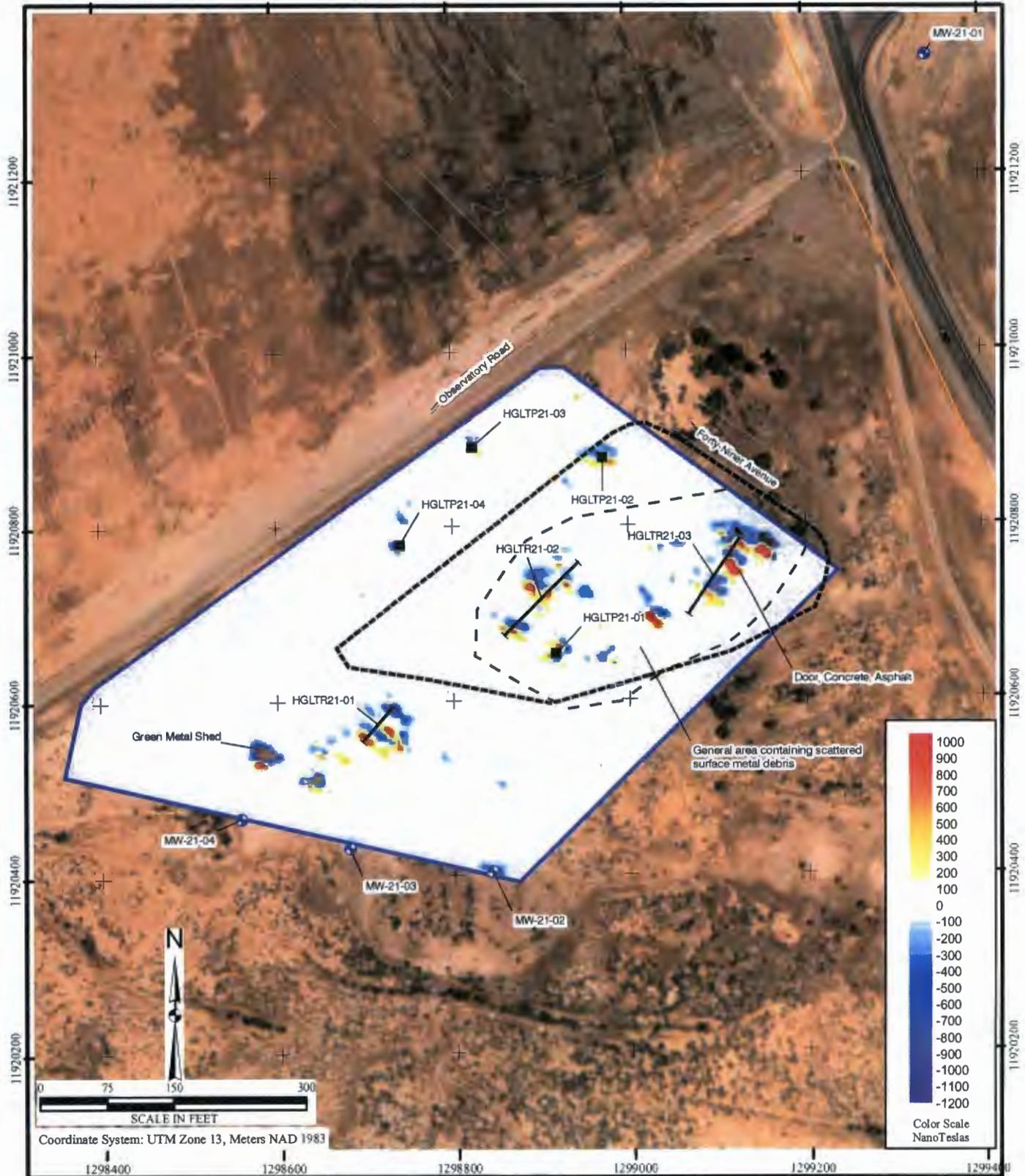
- Laboratory qualifiers--
 assigned as a result of internal laboratory data assessment procedures
 B - Value less than CRDL but greater than or equal to IDL
 J - estimated value; less than CRDL but greater than or equal to IDL
 UB - Qualifies as non-detect due to presence of analyte in associated laboratory blank
EPA Qualifiers--assigned as a result of independent data validation
 (J) - Estimated value
 (UJ) - Estimated value blow the reporting limit
 (U) Compound was analyzed for but not detected.
- 2003 Validation Qualifiers
 J - Estimated value detected less than the CRDL but greater than the reporting limit.
 U - Compound was analyzed for but not detected. Analyte result was below the CRDL.
 UJ - Estimated as a non-detect at the detection limit.

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values
 Results shaded in **BOLD** and *italics* exceed NMGWQ Ground Water Standards for Human Health and are greater than the background and upgradient values
 Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

[^] Radian (1993)

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FIGURES



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 Project: AFC002-037-04-04-05
 Revised: 04/04/08 TB
 Map Source: Holloman AFB



- Legend**
- Monitoring Well
 - Communication Line
 - Operable Unit Boundary (Base GIS)
 - Magnetic Survey Boundary
 - Trench
 - Test Pit

Figure H2.1
LF-21 (SWMU 116)
Site Layout
Holloman AFB

H.3 LF-22 (SWMU 115), WEST AREA LANDFILL NO. 1

H.3.1 Location/Unit Description

LF-22, West Area Landfill No. 1, is located in an arroyo west of the Solar Observatory (Building 910) and Observatory Road. The location of LF-22 with respect to the surrounding facility is shown on Figure A2. A site layout of LF-22 is provided as Figure H3.1. LF-22 is an undeveloped, moderately vegetated, rectangular-shaped portion of land approximately three acres in size surrounding a former arroyo. The site trends in a northeast-southwest direction and is bordered to the east and southeast by an unpaved segment of Observatory Road and to the south, southwest, northwest, and north by undeveloped land. Vegetation consists of salt cedars, shrubs, cactus, and grasses. The salt cedars are located primarily within and immediately around the former arroyo. Access to LF-22 is unrestricted; however, the site is located in a secluded portion of the base. Debris consisting almost exclusively of concrete rubble is present within the former arroyo. Several former metal sign posts and a few metal pipes are also present.

H.3.2 History/Current and Anticipated Future Land Use

LF-22 was active between 1974 and 1978. The site was reportedly used to dispose of plastic sheeting, boxes, and empty cans. Disposal operations ceased after the site was identified as an unapproved landfill. During a records search, one interviewee indicated that some 55-gallon drums were observed during the active period of disposal.

The current and anticipated future land use is industrial.

H.3.3 Evaluation of Relevant Information

In 1992, a RI, consisting of installing and sampling four groundwater monitoring wells (MW22-01 through MW22-04) was conducted (Radian, 1994). The locations of the monitoring wells are depicted on Figure H3.1. The groundwater samples were analyzed for VOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, chlorinated herbicides, total metals, anions, and TDS. The results of the RI groundwater investigation are presented on Table H3.1. Only cadmium (11 µg/L in MW22-02) was detected at a concentration above background and NMGWQ standard of 10 µg/L. Pesticides 4,4'-DDE and alpha-BHC were detected at low concentrations in downgradient monitoring well MW22-04. Several halogenated VOCs were detected at estimated low levels in the upgradient well MW22-01 and several non-halogenated VOCs were present at estimated low levels in MW22-02. A risk characterization of LF-22, conducted as part of the RI, concluded that LF-22 did not present an unacceptable risk even under worst-case exposure conditions.

Based on the RI results, Holloman AFB submitted a Decision Document (Radian, 1995) concluding a no-action remedy was appropriate for LF-22. As part of the no-action remedy, surface debris would be removed, a plat of survey would be produced, and LTM would be conducted at the site at the request of NMED and EPA. LTM activities would consist of the biennial collection and analysis of groundwater samples from the three onsite wells for 10 years to ensure that any potential future release from the site would be detected. NMED concurred with and signed the Decision Document.

LTM activities were initiated in 1995. A summary of the groundwater positive detections since LTM was initiated in 1995 is provided as Table H3.2. Modification of the required analyte list was conducted over the course of the LTM program due to lack of analyte detections. After the 1999 LTM event, NMED approved the cessation of monitoring for PCBs, pesticides, and herbicides. Subsequent analyte reductions reduced the required analyte list to include only arsenic, barium, iron, manganese, and selenium. No constituents in the downgradient wells have been detected above upgradient concentrations and NMGWQ standards over the course of the LTM program. The TDS concentrations of the groundwater beneath LF-22 exceeds 10,000 mg/L, indicating that the water is not a potable or agricultural source.

Holloman AFB submitted a Statement of Basis to NMED requesting NFA status and a permit modification for the site. NMED agreed that LTM could be suspended; however, NFA status for LF-22 would be considered after additional characterization was performed at the site. A supplemental RFI consisting of a geophysical survey and site trenching was conducted at LF-22 in the fall 2005 and spring 2006. The geophysical survey consisted of a terrain conductivity and magnetic in-phase survey. The survey identified one conductivity anomaly and multiple magnetic anomalies. The results of the geophysical survey are depicted on Figure H3.1. The conductivity anomaly and most of the magnetic anomalies were associated with a concrete rubble pile located within a former drainage swale.

On May 18, 2006, three trenches (designated as HGLTR22-01 through HGLTR22-03) were completed at LF-22, bisecting the concrete rubble pile. Site trenching activities determined that the debris consisted almost exclusively of concrete rubble. Metallic and magnetically susceptible debris included rebar within the concrete and metal sign posts. No containers, buckets, or drums used for the storage or disposal of hazardous materials were observed in the LF-22. In addition, no soil staining, unusual solids or fluids, or petroleum odors were observed or detected in the soils comprising and underlying the LF-22 landfill. Beneath the fill material, undisturbed reddish brown to light beige, moderately soft, damp to moist, silty sand containing calcite crystals was observed. There was no visual or field screening evidence that the unit had been impacted from hazardous material disposal activities. Consequently, no soil samples were collected for laboratory analysis.

Based on the findings of the additional characterization, the RFI recommended NFA under NMED Criterion 5 and the transfer of LF-22 from Appendix 4.A Table A to Appendix 4.A Table B of the RCRA permit. On May 1, 2007, NMED approved the RFI report (NMED, 2007). A copy of the approval letter is provided as Figure H1.2.

H.3.4 Basis for Determination

NMED concurred with the RFI conclusion that SWMU 115 (LF-22) is suitable for NFA based on NMED 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.

H.3.5 References

- New Mexico Environment Department (NMED), 2007. Approval of the Supplemental RCRA Facility Investigation Report, LF-19 (SWMU 105), LF-21 (SWMU 116), LF-22 (SWMU 115), and LF-23 (SWMU 108), February 2007, Holloman Air Force Base, EPA ID#NM6572124422, HWB-HAFB-07-003. May 1.
- Radian Corporation (Radian), 1992. RI, Report, Volume II of III, Appendices A, B, C, and D, Investigation, Study and Recommendation for 29 Waste Sites.
- Radian, 1993. Preliminary Assessment and Site Investigation Report, Investigation of Four Waste Sites, Holloman Air Force Base, New Mexico.
- Radian, 1994. Draft Final Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Volume 1, Holloman AFB, New Mexico. October.
- Radian, 1995. Decision Documents, Multiple Sites.

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TABLES

Table H3.1
Remedial Investigation Groundwater Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Location:	Background¹	EPA MCL	NMGWQ Standard	Detection Limit	MW-22-01 (upgradient)	MW-22-02	MW-22-03	MW-22-04
Analyses								
EPA 160.1- Total Dissolved Solids (mg/L)	43,600	--	1,000	10	18,000	27,000	18,000	10,000
EPA 300.0- Chloride (mg/L)	19,600	--	250	26	6,200	11,000	8,200	3,900
EPA 300.0- Sulfate (mg/L)	7,470	--	600	5.0	3,500	3,300	2,800	2,900
EPA 340.2- Fluoride (mg/L)	4.7	4	1.6	0.10	2.4	1.9	2.5	3
EPA 353.1- Nitrate-Nitrite (mg/L)	98	--	--	0.11	4.3	7.7	7.1	4.3
EPA 365.2- Total Phosphorous (mg/L)	0.75	--	--	0.0020	0.057	0.13	0.22	0.18
SW6010- Metals (µg/L)								
Cadmium	8.3	5	10	5	7.7	II	< 5	< 5
Chromium	234	100	10	10	< 10	< 10	< 10	13
Nickel	43.6	--	200 [^]	20	23	44	ND	29
Zinc	253.4	--	10,000	20	< 20	< 20	< 20	28
SW7421- Lead (µg/L)	19.9	15	50	3	< 3	< 3	7.9	4.9
SW8080 - Organochlorine Pesticides and PCBs (µg/L)								
4,4' - DDE	--	--	--	0.0094	< 0.0094	< 0.0094	< 0.0094	0.010 C
alpha - BHC	--	--	--	0.0094	< 0.0094	< 0.0094	< 0.0094	0.015 C
SW8240 - Volatile Organics (µg/L)								
1,1,2,2- Tetrachloroethane	--	--	10	5.0	0.098 J	< 5.0	< 5.0	< 5.0
1,1- Dichloroethane	--	--	25	5.0	1.9 J	< 5.0	< 5.0	< 5.0
Acetone	--	--	--	100	< 100	16 J	< 100	< 100
Benzene	--	5	10	5.0	< 5.0	0.14 J	< 5.0	< 5.0
Carbon disulfide	--	--	--	5.0	4.4 J	< 5.0	< 5.0	< 5.0
Chlorobenzene	--	100	--	5.0	< 5.0	0.33 J	< 5.0	< 5.0
Methylene chloride	--	--	100	5.0	0.76 JB	10 B	3.9 J	26 B
Tetrachloroethene	--	5	20	5.0	1.5 J	< 5.0	< 5.0	< 5.0
Toluene	--	1,000	750	5.0	< 5.0	0.23 J	< 5.0	< 5.0
Trichloroethene	--	5	100	5.0	1.2 J	< 5.0	< 5.0	< 5.0

Table H3.1 (continued)
Remedial Investigation Groundwater Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Note: Table presents only constituents detected in groundwater at this site.

C = Presence and quantitation of analyte confirmed by second column analysis.

J = Detected below the detection limit.

B = Analyte detected in laboratory blank analysis, no blank subtraction performed.

ND = Not Detected, at the reported detection limit.

-- No value or standard was found

SWMU = solid waste management unit

AFB = Air Force Base

NM = New Mexico

mg/L = milligrams per liter

µg/L = micrograms per liter

EPA = United States Environmental Protection Agency

MCL = Maximum Contaminant Level

NMGWQ = New Mexico Groundwater Quality

< = less than

^ NMGWQ Ground Water Standard for Irrigation Use

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values

Results shaded in **BOLD** and *italics* exceed NMGWQ Ground Water Standards for Human Health and are greater than the background and upgradient values

Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

¹ Source for metals background values: Radian (1993). Source for all other background values: Radian (1992)

Table H3.2
Long Term Groundwater Monitoring Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-22-01 ⁴				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	4.1 UB	< 3	NA	NA
Tetrachloroethylene	--	5	20	ND	2.6 J	< 3	NA	NA
Trichloroethylene	--	5	100	ND	1.7 J	1 J	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	11.8 B (J)	11.5 (J)	23.7
Barium	85.2	2000	1000	ND	27	23.6 B (J)	20.7	14.2
Chromium	7.2	100	50	ND	ND	< 0.6	NA	NA
Iron	--	--	1000	ND	ND	< 21	< 1000	< 200
Lead	5.6	15	50	ND	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	ND	54	8.9 B (J)	65.7
Selenium	85.3	50	50	ND	ND	4.1 B (J)	< 10 (UJ)	< 10
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
2,4-D	--	--	--	ND	ND	< 0.08	NA	NA
MCP	--	--	--	ND	ND	34 P (J)	< 0.5	NA
Picloram	--	500	--	ND	ND	0.046 P (J)	< 0.5	NA

Table H3.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-22-02				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	1 J	NA	NA
Methylene chloride	--	--	100	ND	ND	< 3	NA	NA
Tetrachloroethylene	--	5	20	ND	ND	< 3	NA	NA
Trichloroethylene	--	5	100	ND	ND	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	12 B (J)	6.8 B (J)	16.1
Barium	85.2	2000	1000	ND	29	29.5 B (J)	17.6	19.8
Chromium	7.2	100	50	ND	ND	< 0.6	NA	NA
Iron	--	--	1000	ND	ND	< 21	< 1000	123 J
Lead	5.6	15	50	ND	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	ND	0.7 B	< 10 (UJ)	< 10
Selenium	85.3	50	50	ND	ND	13.7 B (J)	3.3 B (J)	17.2
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Polychlorinated Biphenyls (µg/L)								
all	--	--	--	ND	ND	NA	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
2,4-D	--	--	--	ND	ND	< 0.8	NA	NA
MCP	--	--	--	ND	ND	< 20	NA	NA
Picloram	--	500	--	ND	ND	< 0.04	NA	NA

Table H3.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMED (µg/L)	MW-22-03				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	ND	< 3	NA	NA
Tetrachloroethylene	--	5	20	ND	ND	< 3	NA	NA
TCE	--	5	100	ND	ND	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	6.4 B (J)	8.8 B (J)	14.2
Barium	85.2	2000	1000	ND	27	30.2 B (J)	47.8 B	17.5
Chromium	7.2	100	50	ND	ND	< 0.6	NA	NA
Iron	--	--	1000	ND	ND	< 21	< 10,000	33.8 J
Lead	5.6	15		ND	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	ND	38.7	44.4 (J)	39.8
Selenium	85.3	50	50	ND	ND	17.2 B (J)	10.2 (J)	12.3
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
2,4-D	--	--	--	ND	ND	< 0.08	NA	NA
MCP	--	--	--	ND	ND	< 20	NA	NA
Picloram	--	500	--	ND	ND	< 0.04	NA	NA

Table H3.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Well Number Sampling Data	Background [^]	EPA MCL (µg/L)	NMED (µg/L)	MW-22-04				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Chloroform	--	--	100	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	ND	< 3	NA	NA
Tetrachloroethylene	--	5	20	ND	ND	< 3	NA	NA
TCE	--	5	100	ND	ND	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	5.3 B (J)	5.2 B (J)	18.6
Barium	85.2	2000	1000	ND	10	16.8 B (J)	16.1	12.7
Chromium	7.2	100	50	ND	ND	1.6 B	NA	NA
Iron	--	--	1000	ND	86	51.2 B	< 1000	123 J
Lead	5.6	15		ND	ND	< 1.5	< 10 (UJ)	NA
Manganese	--	--	200	ND	29	52.1	38.6 (J)	62.2
Selenium	85.3	50	50	ND	ND	4.6 B (J)	< 10 (UJ)	< 10
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
2,4-D	--	--	--	ND	ND	0.51 P (J)	NA	NA
MCP	--	--	--	ND	ND	< 20	NA	NA
Picloram	--	500	--	ND	ND	< 0.04	NA	NA

Table H3.2 (continued)
Long Term Groundwater Monitoring Analytical Results
LF-22 (SWMU 115)
Holloman AFB, New Mexico

Notes:

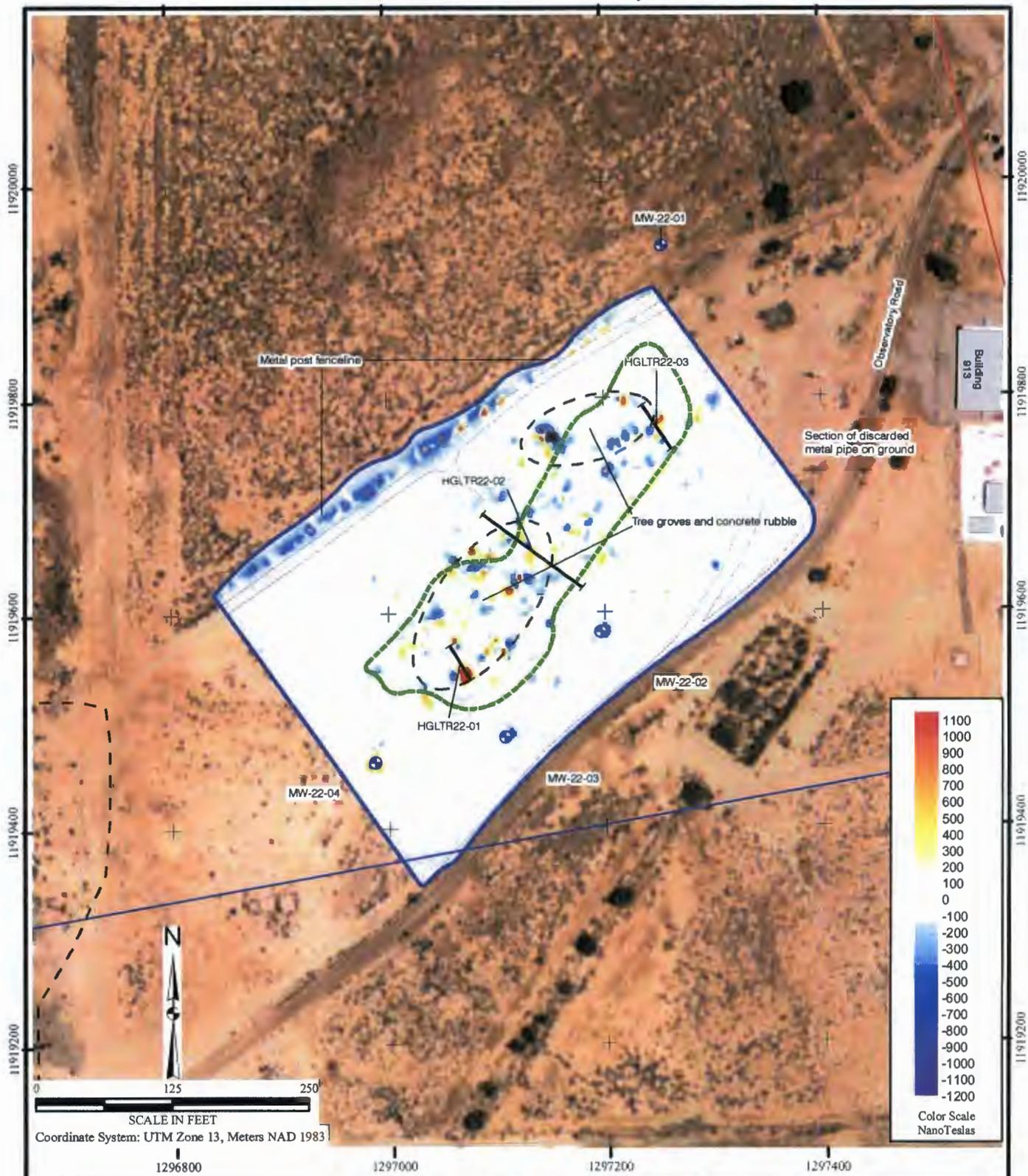
- ¹ Unless otherwise reported, no VOCs were detected prior to 2001 using EPA Method 8260B. (EPA Method 8260A was used to analyze for VOCs in the 1995 and 1997 programs.)
- ² Unless otherwise reported, no metals were detected using EPA Methods 6010B Trace & 7470A. (EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)
- ³ Unless otherwise reported, no organochlorine pesticides were detected prior to 1999 using EPA Method 8081A. (EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)
- ⁴ Upgradient monitoring well
- CRDL = Contract Required Detection Limit
IDL = Instrument Detection Limit
NA = not analyzed
ND = not detected at or above method reporting limit
VOC = volatile organic compound
µg/L = micrograms per liter
-- = No value or standard was found
SWMU = solid waste management unit
AFB = Air Force Base
NM = New Mexico
EPA = United States Environmental Protection Agency
NMGWQ = New Mexico Groundwater Quality

- Laboratory qualifiers--
assigned as a result of internal laboratory data assessment procedures
B - Value less than CRDL but greater than or equal to IDL
J - estimated value; less than CRDL but greater than or equal to IDL
UB - Qualifies as non-detect due to presence of analyte in associated laboratory blank
- EPA Qualifiers--assigned as a result of independent data validation
(J) - Estimated value
(UJ) - Estimated value below the reporting limit
(U) Compound was analyzed for but not detected.
- 2003 Validation Qualifiers
J - Estimated value detected less than the CRDL but greater than the reporting limit.
U - Compound was analyzed for but not detected. Analyte result was below the CRDL.
UJ - Estimated as a non-detect at the detection limit.

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values
Results shaded in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and are greater than the background and upgradient values
Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

^ Radian (1993)

FIGURES



File X:\AFC002\Holloman_AFB\TO37\Maps\
SOB_7_Sites\LF-22_Trench.mxd
Project: TT3001.02.01
Revised: 04/04/08 TB
Map Source: Holloman AFB



Legend

- Monitoring Well
- Water Line
- Electric Line (Below Ground)
- Unit Boundary Implied by Geophysics
- Magnetic Survey Boundary
- Trench

Figure H3.1
LF-22 (SWMU 115)
Site Layout
Holloman AFB

Figure H3.1 LF-22 (SWMU 115) Site Layout, Holloman AFB

H.4 LF-23 (SWMU 108), MOBILITY SUPPORT SQUADRON LANDFILL

H.4.1 Location/Unit Description

LF-23, the MOBSS Landfill, is located southwest of the Solar Observatory (Building 910), west of Observatory Road, and approximately 350 feet southwest of LF-22. The location of LF-23 with respect to the surrounding facility is shown on Figure A2. A site layout of LF-23 is provided as Figure H4.1. LF-23 is an undeveloped, rectangular-shaped parcel of land, trending in a north-south orientation, approximately three acres in size. The site is moderately vegetated with shrubs, salt cedars (in the southwestern corner), and cactus. Construction debris consisting of predominantly concrete and asphalt rubble, as well as metal sign posts, and metal cables, were observed throughout LF-23, but primarily in the southern portion of the unit. Several fox holes constructed of sand bag and barbed wire fencing are present in the southern portion of LF-23. The presence of the fox holes indicates the use of LF-23 for military training exercises. Numerous unpaved service roads lie adjacent to and cross LF-23 along the eastern and southern site boundaries and through the central portion of LF-23.

H.4.2 History/Current and Anticipated Future Land Use

LF-23 received waste disposal items from 1976 to 1979. The site was reportedly used for the disposal of plastic sheeting, boxes, and empty cans. Disposal operations ceased after the site was identified as an unapproved landfill. During a records search, one interviewee indicated that cans of diazinon, dibromochloromethane, and 55-gallon drums of unknown contents were reportedly observed at the site.

The current and anticipated future land use is industrial.

H.4.3 Evaluation of Relevant Information

In 1992, a RI (Radian, 1994), consisting of the installation and sampling of four groundwater monitoring wells (MW23-01 through MW23-04) was conducted at LF-23 (SWMU 108) (Figure H4.1). The collected groundwater samples were analyzed for VOCs, organochlorine pesticides, organophosphorus pesticides, PCBs, chlorinated herbicides, total metals, anions, and TDS. RI groundwater analytical results are presented in Table H4.1. No site-related VOCs and no organophosphorus pesticides, chlorinated herbicides, or PCBs were detected in the groundwater. Organochlorine pesticide delta-BHC was detected at low levels in MW23-02 and MW23-04. Since these two wells are located in a borrow pit that fills with runoff water from the Base during rainfall events, the RI suggested that the presence of delta-BHC may be attributable to runoff, given the lack of other detected constituents. The RI concluded that the MOBSS Landfill had little impact on the local groundwater, and a risk characterization of the site concluded that LF-23 did not present an unacceptable risk even under worst-case exposure conditions.

Based on the results of the RI, Holloman AFB submitted a Decision Document (Radian, 1994) concluding that a no-action remedy was appropriate for LF-23. As part of the no-action remedy, surface debris would be removed, a plat of survey would be produced, and LTM would be conducted at the site at the request of NMED and EPA. LTM activities would consist of the biennial collection and analysis of groundwater samples from the three onsite wells for 10 years

to ensure that any potential future release from the site would be detected. NMED concurred with and signed the Decision Document.

LTM activities were initiated in 1995. Over the course of the LTM program, the TAL was reduced until in 2003 the analyte list consisted only of barium, iron, manganese, and selenium. Since 1995, no chemical of potential concern (COPC) has been detected at concentrations exceeding background and NMGWQ standards. A summary of the groundwater positive detections since LTM began is provided as Table H4.2. The TDS concentration of the groundwater beneath LF-23 exceeds 10,000 mg/L, indicating that the water is not a potable or agricultural source. Based on the analytical results, Holloman AFB submitted a Statement of Basis to NMED, after the 2003 LTM event, requesting NFA status and a permit modification for the site. NMED agreed to suspend LTM, but stated that NFA for LF-23 would be considered after additional characterization was performed at the site.

In the fall 2005 and spring 2006, a supplemental RFI was conducted to provide the additional characterization data needed by NMED. The supplemental RFI included a geophysical survey (terrain conductivity and in-phase magnetic survey) and site trenching. The geophysical surveying identified one conductivity anomaly and multiple magnetic anomalies. The conductivity anomaly and most of the magnetic anomalies were associated with concrete rubble pile located along the eastern edge of an arroyo. The in-phase magnetic survey results are presented on Figure H4.1.

On May 17 and 18, 2006, four trenches (designated as HGLTR23-01 through HGLTR21-04) were completed at LF-23 to investigate the geophysical anomalies. The locations of the trenches are presented on Figure H4.1. Fill material, consisting primarily of construction debris, was observed in all four trenches. The fill material ranged in thickness from 1 foot (HGLTR23-04) to 4.5 feet (HGLTR23-02). Debris encountered included concrete rubble (including a concrete utility box and drainage culvert), former communication line, asphalt, wiring, cording, a tarpaulin, metal piping, metal sign posts, metal railing, rubber bands, and a partially crushed 5-gallon water can. Visual evidence and field screening results indicated the presence or release of hazardous materials. No canisters, buckets, or drums potentially used to store or dispose hazardous materials were encountered in the landfill. Beneath the fill material, undisturbed soils composed primarily of moderately loose, light brown to reddish brown, silty sand was encountered to the maximum excavated trench depth. No soil staining, unusual solids or fluids, or petroleum odors were encountered in the soils comprising and underlying the LF-23 landfill. Consequently, no soil samples were collected for laboratory analysis.

Based on the findings of the additional characterization, the RFI recommended NFA under NMED Criterion 5 and the transfer of LF-21 from Appendix 4.A Table A to Appendix 4.A Table B of the RCRA permit. On May 1, 2007, NMED approved the RFI report (NMED, 2007). A copy of the approval letter is provided as Figure H1.2.

H.4.4 Basis for Determination

NMED concurred with the RFI conclusion that SWMU 108 (LF-23) is suitable for NFA based on NMED 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.

H.4.5 References

- New Mexico Environment Department (NMED), 2007. Approval of the Supplemental RCRA Facility Investigation Report, LF-19 (SWMU 105), LF-21 (SWMU 116), LF-22 (SWMU 115), and LF-23 (SWMU 108), February 2007, Holloman Air Force Base, EPA ID#NM6572124422, HWB-HAFB-07-003. May 1.
- Radian Corporation (Radian), 1992. RI, Report, Volume II of III, Appendices A, B, C, and D, Investigation, Study and Recommendation for 29 Waste Sites.
- Radian, 1993. Preliminary Assessment and Site Investigation Report, Investigation of Four Waste Sites, Holloman Air Force Base, New Mexico.
- Radian, 1994. Decision Documents, Investigation, Study, and Recommendation for 29 Waste Sites, Holloman AFB, New Mexico. September.
- Radian, 1994b. Draft Final Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Volume 1, Holloman AFB, New Mexico. October.

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TABLES

Table H4.1
Remedial Investigation Groundwater Analytical Results
LF-23 (SWMU 108)
Holloman AFB, New Mexico

Location	Background ¹	EPA MCL	NMGWQ Standard	Detection Limit	MW-23-01 (upgradient)	MW-23-02	MW-23-03	MW-23-04
Analyses								
Inorganic Results								
EPA 160.1- Total Dissolved Solids (mg/L)	43,600	--	1,000	(10)	<i>37,000</i>	<i>40,000</i>	<i>31,000</i>	<i>23,000</i>
EPA 300.0- Chloride (mg/L)	19,600	--	250	(26)	<i>13,000</i>	20,000	<i>16,000</i>	<i>11,000</i>
EPA 300.0- Sulfate (mg/L)	7,470	--	600	(10)	<i>5,900</i>	<i>5,800</i>	<i>4,600</i>	<i>3,700</i>
EPA 340.2- Fluoride (mg/L)	4.7	4	1.6	(0.10)	1.5	1.0	1.1	1.4
EPA 353.1- Nitrate-Nitrite (mg/L)	98	--	--	(0.022)	0.74	13	9.8	13
EPA 365.2- Total Phosphorous (mg/L)	0.75	--	--	(0.020)	0.091	0.73	0.16	0.16
SW6010- Metals (µg/L)								
Cadmium	8.3	5	10	(5)	< 5	<i>5.9</i>	< 5	< 5
Chromium	234	100	10	(10)	< 10	10	< 10	< 10
Copper	38.6	--	1,000	(20)	< 20	31	< 20	< 20
Nickel	43.6	--	200 [^]	(20)	< 20	36	22	< 20
SW7421- Lead (µg/L)	19.9	15	50	(6)	< 6	15	< 6	< 6
Organic Results								
SW8080 - Organochlorine Pesticides and PCBs (µg/L)								
delta - BHC	--	--	--	(0.0095)	< 0.0095	0.17 X	< 0.0095	0.014 X
SW8240 - Volatile Organics (µg/L)								
Methylene Chloride	--	--	100	(5)	< 5.0	9.6	4.6 J	9.3

Note: Table presents only constituents detected in ground water at this site.

X = SW8080-- Presence of analyte confirmed by second column analysis, but quantitation was not confirmed. J = Detected below the detection limit.

SWMU = solid waste management unit

NM = New Mexico

µg/L = micrograms per liter

MCL = Maximum Contaminant Level

-- = No value or standard was found

AFB = Air Force Base

mg/L = milligrams per liter

EPA = United States Environmental Protection Agency

NMGWQ = New Mexico Groundwater Quality

[^] NMGWQ Standard for Irrigation Use

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values

Results shaded in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and are greater than the background and upgradient values

Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

¹ Source for metals background values: Radian (1993). Source for all other background values: Radian (1992)

Table H4.2
Long Term Groundwater Analytical Results
LF-23 (SWMU 108)
Holloman AFB, New Mexico

Well Number Sampling Data	Background	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-23-01 ⁶				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Acetone	--	--	--	ND	ND	1 J	NA	NA
Bromoform	--	--	--	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	20	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	7.9 B (J)	NA	NA
Barium	85.2	2000	1000	ND	ND	21.5 B (J)	22.9	< 10
Cadmium	7.4	5	10	ND	ND	< 0.3	NA	NA
Iron	--	--	1000	ND	ND	646	< 10,000	< 2000
Manganese	--	--	200	ND	ND	348	223 (J)	13.6 J
Selenium	85.3	50	50	ND	ND	16.4 B (J)	9.5 B (J)	44 J
Silver	6.7	--	50	ND	ND	< 0.5	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls ⁴ (µg/L)								
all	--	0.5	1	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
4-Nitrophenol	--	--	--	ND	ND	0.085 P (J)	< 0.5	NA

Table H4.2 (continued)
Long Term Groundwater Analytical Results
LF-23 (SWMU 108)
Holloman AFB, New Mexico

Well Number	Background	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-23-02				
Sampling Data				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Acetone	--	--	--	ND	ND	< 5	NA	NA
Bromoform	--	--	--	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	ND	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	6.2 B (J)	NA	NA
Barium	85.2	2000	1000	ND	21	29.1 B (J)	32.3 B	10.1 J
Cadmium	7.4	5	10	ND	ND	0.7 B	NA	NA
Iron	--	--	1000	ND	ND	< 110	< 10000	< 2000
Manganese	--	--	200	ND	ND	12.6 B	9.9 B (J)	< 100
Selenium	85.3	50	50	ND	13	57.4 B (J)	24.2 (J)	< 100
Silver	6.7	--	50	ND	ND	5.2 B (J)	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls ⁴ (µg/L)								
all	--	0.5	1	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
4-Nitrophenol	--	--	--	ND	ND	< 0.08	NA	NA

Table H4.2 (continued)
Long Term Groundwater Analytical Results
LF-23 (SWMU 108)
Holloman AFB, New Mexico

Well Number	Background	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-23-03				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Acetone	--	--	--	ND	ND	< 5	NA	NA
Bromoform	--	--	--	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	18 UB	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	< 3	NA	NA
Barium	85.2	2000	1000	ND	20	25.3 B (J)	35.0 B	15 J
Cadmium	7.4	5	10	ND	ND	< 0.3	NA	NA
Iron	--	--	1000	ND	ND	< 110	< 10,000	< 2000
Manganese	--	--	200	ND	ND	80.3	13.9 (J)	43.6 J
Selenium	85.3	50	50	ND	11 JS	42.7 B (J)	13.6 (J)	96.9
Silver	6.7	--	50	ND	ND	< 0.5	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls ⁴ (µg/L)								
all	--	0.5	1	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
4-Nitrophenol	--	--	--	ND	ND	< 0.08	NA	NA

Table H4.2 (continued)
Long Term Groundwater Analytical Results
LF-23 (SWMU 108)
Holloman AFB, New Mexico

Well Number	Background	EPA MCL (µg/L)	NMGWQ Standard (µg/L)	MW-23-04				
				Aug-95	Sep-97	Sep-99	Sep-01	Apr-03
VOCs ¹ (µg/L)								
Acetone	--	--	--	ND	ND	1 J	NA	NA
Bromoform	--	--	--	ND	ND	< 3	NA	NA
Methylene chloride	--	--	100	ND	ND	< 3	NA	NA
Metals ² (µg/L)								
Arsenic	35.4	10	100	ND	ND	3.8 B (J)	< 10	NA
Barium	85.2	2000	1000	ND	ND	33.3 B (J)	41.1 B	10.6 J
Cadmium	7.4	5	10	ND	ND	< 0.3	NA	NA
Iron	--	--	1000	ND	ND	91.1 B	< 10000	< 2000
Manganese	--	--	200	ND	ND	98.5	55.4 (J)	< 100
Selenium	85.3	50	50	ND	ND	13.0 B (J)	6.9 B (J)	< 100
Silver	6.7	--	50	ND	ND	< 0.5	NA	NA
Organochlorine Pesticides ³ (µg/L)								
all	--	--	--	ND	ND	ND	NA	NA
Polychlorinated Biphenyls ⁴ (µg/L)								
all	--	0.5	1	ND	ND	ND	NA	NA
Chlorinated Herbicides ⁵ (µg/L)								
4-Nitrophenol	--	--	--	ND	ND	< 0.08	NA	NA

Table H4.2 (continued)
Long Term Groundwater Analytical Results
LF-23 (SWMU 108)
Holloman AFB, New Mexico

Notes:

- 1 Unless otherwise reported, no VOCs were detected prior to 2001 using EPA Method 8260B. (EPA Method 8260A was used to analyze for VOCs in the 1995 and 1997 programs.)
- 2 Unless otherwise reported, no metals were detected using EPA Methods 6010B Trace & 7470A. (EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)
- 3 Unless otherwise reported, no organochlorine pesticides were detected prior to 1999 using EPA Method 8081A. (EPA Method 8080A was used to analyze for organochlorine pesticides in the 1995 and 1997 programs.)
- 6 Upgradient monitoring well
- CRDL = Contract Required Detection Limit
- IDL = Instrument Detection Limit
- NA = not analyzed
- ND = not detected at or above method reporting limit
- VOC = volatile organic compound
- µg/L = micrograms per liter
- = No value or standard found
- EPA = United States Environmental Protection Agency
- MCL = Maximum Contaminant Level
- NMGWQ = New Mexico Groundwater Quality
- AFB = Air Force Base
- NM = New Mexico
- SWMU = solid waste management unit

Results in **BOLD** and *italics* exceed EPA Primary Drinking Water MCLs and are greater than the background and upgradient values
 Results shaded in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and are greater than the background and upgradient values
 Results in *italics* exceed EPA or NMGWQ standards but are below background and/or upgradient levels

^ Radian (1993)

Laboratory qualifiers---

assigned as a result of internal laboratory data assessment procedures

B - Value less than CRDL but greater than or equal to IDL

J - estimated value; less than CRDL but greater than or equal to IDL

UB - Qualifies as non-detct due to presence of analyte in associated laboratory blank

EPA Qualifiers--assigned as a result of independent data validation

(J) - Estimated value

(UJ) - Estimated value blow the reporting limit

(U) Compound was analyzed for but not detected.

2003 Validation Qualifiers

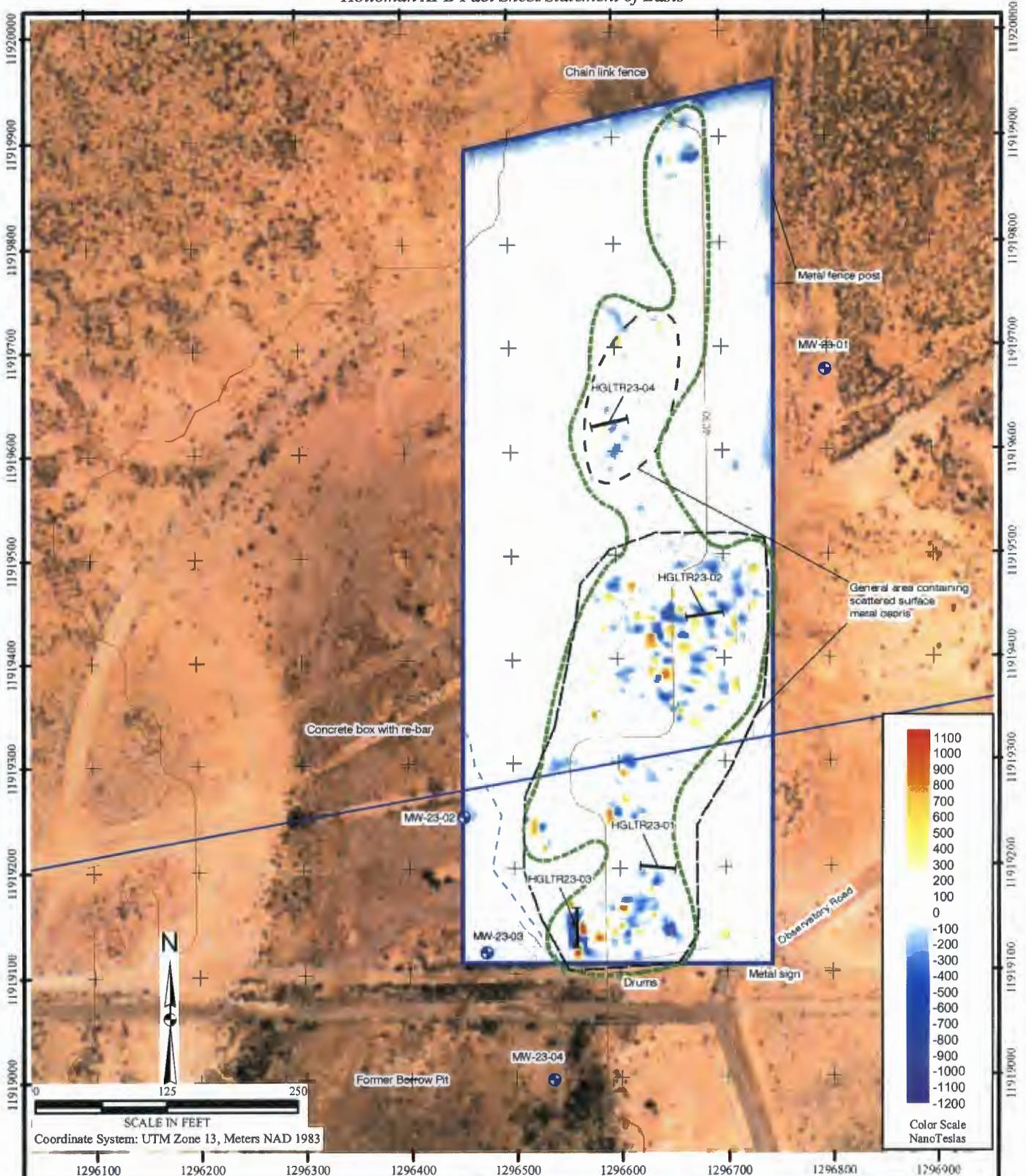
J - Estimated value detected less than the CRDL but greater than the reporting limit.

U - Compound was analyzed for but not detected. Analyte result was below the CRDL.

UJ - Estimated as a non-detect at the detection limit.

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FIGURES



File X:\AFC002\Holloman_AFB\TO37\Maps\SOB_7_Sites\LF-23_Trench.mxd
 Project: TT3001.02.01
 Revised: 04/04/08 TB
 Map Source: Holloman AFB



Legend	
	Monitoring Well
	Water Line (Underground)
	Magnetic Survey Boundary
	Elevation Contour
	Borrow Pit
	Unit Boundary Implied by Geophysics
	Trench

Figure H4.1
LF-23 (SWMU 108)
Site Layout
Holloman AFB

H.5 OT-44 [AOC P (FORMERLY SITE 50)], BUILDING 301 FUEL TANK LEAKS

H.5.1 Location/Unit Description

OT-44 (AOC-P, formerly designated as Site 50) encompassed a hydrocarbon plume formerly present on the groundwater immediately south of Building 301, an aircraft maintenance hanger adjacent to the Holloman AFB main taxiway. The location of OT-44 (AOC-P) with respect to the surrounding facility is shown on Figure A2. The buildings around Site OT-44 serve as an aircraft maintenance hangar (Building 301), a fuel barn (Building 315), and a training facility (Building 302). OT-44 is located within an asphalt-paved area lying between Building 301 and a cinder block wall. A site layout of OT-44 is included as Figure H5.1.

H.5.2 History/Current and Anticipated Future Land Use

OT-44 was initially identified after free phase hydrocarbons were observed on the water table during exploratory trenching activities for installation of a sewer line. The source of the hydrocarbons was not determined at that time; however, the source was since identified as a leak within a 25,000-gallon diesel underground storage tank (UST) pipeline. After the piping failed a tank tightness test in 1990, the UST was closed and removed in February 1991. The UST was recorded as being in good condition with no corrosion pits, holes, or leaks noted during the removal process. In March 1997, approximately 60 tons (44.4 cubic yards [yd³]) of total petroleum hydrocarbon (TPH) contaminated soil was removed from OT-44. Excavation activities continued vertically to the top of the water table, located at approximately 5.5 feet bgs during excavation activities. The excavation was then backfilled and resurfaced to grade with asphalt.

The current and anticipated future land use is industrial.

H.5.3 Evaluation of Relevant Information

OT-44 was designated as an area of concern after petroleum hydrocarbons were observed on the groundwater during the installation of a utility line immediately south of Building 301. Upon identification, an IRP Phase II, Stage I Confirmation/Quantification study (Dames and Moore, 1987) was conducted. The study included the installation of an 8-inch monitoring well (designated 50W1) and the completion of one soil boring (designated 50B1). Based on oil and grease detections found during the IRP Phase II, Stage I Confirmation/Quantification study (provided on Tables H5.1 [soil] and H5.2 [groundwater]), a two stage Phase II RI was initiated. Stage 1 of the Phase II RI included installing and sampling (soil and groundwater) four soil borings (designated B1 through B4), which were converted into groundwater monitoring wells (MW1 through MW4) (Walk Haydel, 1988). In addition, a small boring survey consisting of completing 20 small-diameter borings (designated as P1 through P15) on a 10 foot by 10 foot grid across a 20 square foot area located south of Building 301. The investigated area was believed to house a 15,000-gallon heating oil UST; however, the small boring survey failed to locate the UST. Consequently, one additional boring (designated B5) was installed near a newer fiberglass diesel UST. Soil samples obtained from 12.5, 15, and 17.5 feet bgs, were collected from B5 based on field screening results and submitted for total recoverable petroleum hydrocarbon (TRPH). Only the 5 foot bgs soil sample obtained from boring B2 contained contaminants above screening levels (TRPH at 7,946 mg/kg, exceeding the 1,000 mg/kg Base TPH Action Level). TRPHs were

detected solely within MW2 and were detected at a concentration of 17 mg/L. Results of this investigation are provided on Tables H5.3 (soil) and H5.4 (groundwater).

The Stage I RI did not identify the source of the petroleum contamination; therefore, during the Stage 2 portion of the RI, five additional soil borings (P16 through P20) were completed to locate the 15,000-gallon heating oil UST. In addition, a background monitoring well (MW6) was installed and one round of groundwater sampling was conducted. Borings P16 through P20 were completed in an area between Building 301 and the previous 15 soil borings as shown on Figure H5.1. None of the five soil borings located the heating oil UST. Based on the data collected, soil contamination was identified to a depth of 10 feet bgs immediately south of Building 301. Contaminants present included TRPH, fuel-related VOCs, and solvents. Results of this investigation are provided on Tables H5.3 (soil) and H5.4 (groundwater). Groundwater was determined to flow from the northeast to the southwest. As part of the RI, a Baseline Risk Assessment (BRA) was conducted, from which it was determined that OT-44 posed no significant risk to human health or the environment (Walk Haydel, 1989a). Consequently, the RI recommended NFA (Walk Haydel, 1989b) and, based on that recommendation, a Decision Document requesting NFA status for OT-44 was submitted to NMED (Walk Haydel, 1990).

In 1990, the 25,000-gallon diesel UST (UST 5RM 301) located in the immediate vicinity of OT-44 failed a tank tightness test. The approximate location of the diesel UST and its fuel line are shown on Figure H5.1. Three vapor detection points were installed adjacent to an underground pipe running north from the UST into Building 301. A small intermittent leak was detected. The UST was closed in February 2001. During the closure process, the UST was excavated from the subsurface and visually inspected. The UST was determined to be in good condition with no corrosion pits, holes, or leaks noted.

After reviewing the Decision Document, NMED required additional investigation of OT-44 to confirm that TRPH concentrations in soil did not exceed the base TPH action level of 1,000 mg/kg, and as a result, a Phase II RFI was conducted in 1994. The Phase II RFI consisted of completing six soil borings (i.e., 44-B07 through 44-B12) at OT-44 (Foster Wheeler, 1995). Soil samples were collected from 1 to 3 feet bgs and 3 to 5 feet bgs from 44-B08 through 44-B12 and from 0.5 to 2.5 feet bgs, 2.5 to 4.5 feet bgs, and 4.5 to 6.5 feet bgs in boring 44-B0-7 and were submitted for TRPH analysis using EPA Method 418.1. Stained soils were encountered in boring 44-B07 and slightly stained soils were encountered in boring 44-B11. Results of the 1994 Phase II RFI are included as Table H5.5. TRPH were detected in five (44-B07 and 44-B09 through 44-B12) of the six soil borings; but with the exception of 44-B07, were below 500 mg/kg. TRPH concentrations in boring 44-B07 at 0.5 to 2.5 and 2.5 to 4.5 feet bgs were 17,100 mg/kg and 30,700 mg/kg, respectively. TRPH was not detected in the 4.5 to 6.5 foot bgs soil sample in boring 44-B07. The Phase II RFI recommended conditional NFA with NFA status requiring remediation of the TRPH-contaminated soils to the Base-specific cleanup level of 1,000 mg/kg. A Class 3 permit modification request was submitted to EPA Region VI recommending site closure.

In February 1996, additional characterization was performed to further delineate contaminated soil in excess of 1,000 mg/kg (Groundwater Technology, 1996). Three soil borings (OT44-DP1 through OT44-DP3) were completed, characterized, and sampled. Two soil samples per boring, based on field screening results, were collected and analyzed for gasoline-range organics (GRO); diesel-range organics (DRO); TRPH; and benzene, toluene, ethylbenzene, and total xylenes

(BTEX). Table H5.6 summarizes the analytical results of the additional characterization samples. None of the analyzed compounds were detected in boring OT44-DP1. GRO, DRO, and TRPH were detected in borings OT44-DP2 and OT44-DP3, while ethylbenzene and total xylenes were detected solely within boring OT44-DP2. Boring OT44-DP3 was completed in the vicinity of the former UST pipe leak. The highest GRO, DRO, and TRPH concentrations detected in boring OT44-DP3 were detected in the 2- to 4-foot soil interval. TPH concentrations dropped significantly in the 4- to 5-foot soil interval sample. Within boring OT44-DP2, maximum concentrations of the detected analytes were reported in the 5- to 6-foot soil interval. DRO and TRPH concentrations in borings OT44-DP2 and OT44-DP3 exceeded the Holloman AFB TPH action level of 1,000 mg/kg.

Based on the presence of TPH concentrations above 1,000 mg/kg, approximately 60 tons (44.4 yd³) of TPH-impacted soils were excavated from OT-44 and disposed offsite in March 1997 (Foster Wheeler, 1997). Excavation activities were conducted in an area where vadose soils contained TPH concentrations above the Holloman AFB TPH action level of 1,000 mg/kg based on previous soil sampling activities. The excavated area corresponds to a small hole previously identified in the 25,000-gallon diesel UST product line. TPH-impacted soils were excavated to the top of the water table, estimated to be approximately 5 feet bgs. Three verification soil samples were obtained after excavation of the TPH-impacted soils and analyzed for TRPH. The location of the verification soil samples used in determining the extent of excavation activities and their associated TRPH analytical results are depicted on Figure H5.1. The results of the verification samples are also summarized on Table H5.7, which shows that none of the verification soil samples contained TRPH concentrations at or exceeding 1,000 mg/kg.

Biennial LTM of the groundwater was initiated at OT-44 in 1995 and conducted through 2001. Based on historic groundwater analytical results, groundwater samples collected during the LTM events were analyzed solely for VOCs. VOCs detected in the OT-44 groundwater included benzene, sec-butylbenzene, carbon disulfide, chloroform, methylene chloride, toluene, and TCE. The majority of the VOCs were detected in MW2 during the 1997 LTM event. With the exception of carbon disulfide and TCE, all of the VOCs were detected solely during the 1997 LTM event. Carbon disulfide was detected in MW2 in 1995 and 1999 while TCE was detected in MW2 only during the 1999 LTM event. TCE was detected at 1 µg/L. The 1997 LTM event was conducted in September 1997 after TPH excavation activities (i.e., March 1997) had been completed. The presence of the VOCs in groundwater samples retrieved from the downgradient wells was most likely attributable to the agitation of the groundwater system that occurred during excavation activities. None of the historically detected VOCs were detected during the 2001 LTM event. Cessation of OT-44 LTM activities was recommended in the 2001 LTM report (Foster Wheeler, 2002) and NMED concurred. The results of groundwater LTM activities are summarized on Table H5.8.

In January 2007, a request for NFA (HGL, 2007) report was submitted to NMED presenting in detail the results of the various investigations conducted at OT-44, and requested NFA under NMED Criterion 5. In a June 26, 2007, Notice of Deficiency (NOD) letter, NMED required minor revisions to the technical memorandum but concurred with the NFA recommendation (NMED, 2007). A copy of the NOD letter is included as Figure H5.2.

H.5.4 Basis for Determination

NMED concurred with the Request for NFA report conclusion that AOC-P (OT-44) is suitable for NFA based on NMED 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.

H.5.5 References

- Dames and Moore, 1987. Installation Restoration Program Phase II – Confirmation/Quantification Stage 1 Report (April 1984 to March 1985), Holloman Air Force Base, New Mexico. March 6.
- Foster Wheeler Environmental Corp. (Foster Wheeler), 1995. Draft Final Phase II RCRA Facility Investigation Report, Table 1 Solid Waste Management Units, Volume 1. June.
- Foster Wheeler, 1997. Final Closure Report Addendum for Phase II Remediation of POL Contaminated Sites and Oil/Water Separator and Waste Oil Tank Removals. December.
- Foster Wheeler, 2002. Final 2001 Long-Term Groundwater Monitoring Report, Holloman Air Force Base, New Mexico. July.
- Groundwater Technology Government Services (Groundwater Technology), 1996. Additional Characterization of POL-Contaminated Sites SWMU-3, SWMU-8, SWMU-36, SWMU-123, and OT-44, Holloman Air Force Base, New Mexico. February 29.
- HydroGeoLogic, Inc. (HGL), 2007. Request for No Further Action, OT-44 (AOC P), Holloman Air Force Base, New Mexico. January.
- New Mexico Environment Department (NMED), 2007. Notice of Deficiency, Request for No Further Action, OT-44 (AOC-P), January 2007, Holloman Air Force Base, EPA ID#NM6572124422, HWB-HAFB-07-004. June 26.
- Walk, Haydel and Associates, Inc. (Walk Haydel), 1988. Stage 1 Drilling and Sampling Technical Report. June.
- Walk Haydel, 1989a. Installation Restoration Program Remedial Investigation, Final Baseline Risk Assessment. December.
- Walk Haydel, 1989b. Installation Restoration Program Remedial Investigation Final Remedial Investigation Report, Holloman Air Force Base, New Mexico, Volume I. December.
- Walk Haydel, 1990. Installation Restoration Program, Holloman Air Force Base, New Mexico, Decision Documents, Site LF-01 (Old Site 1) – Main Base Landfill; Site LF-10 (Old Site 10) – Old Main Base Landfill; Site SD-25 (Old Site 25) – Drainage Lagoon; Site FT-31 (Old Site 31) – Fire Department Training Area; Site OT-44 (Old Site 50) – Building 301, Aircraft Maintenance Hangar; Site SS-46 (Old Site 53) – JP4 Underground Waste Tank; and Site SS-48 (Old Site 55) – Military Gas Station. November.

TABLES

Table H5.1
Soil Analytical Results
IRP Phase II Stage I Confirmation/Quantification Study
OT-44 (AOC P)
Holloman AFB, New Mexico

Parameter	unit	5-6.5	7.5-9	10-11.5	5-6.5	7.5-9
		(feet)	(feet)	(feet)	(feet)	(feet)
Arsenic	mg/kg	--	--	--	--	--
Cadmium	mg/kg	--	--	--	--	--
Nickel	mg/kg	--	--	--	--	--
Lead	mg/kg	--	--	--	--	--
Silver	mg/kg	--	--	--	--	--
Chromium (hexavalent)	mg/kg	--	--	--	--	--
Oil and grease	mg/kg	160	3,700	1,143	1,192	4,265
TOC	mg/kg	--	--	--	--	--
TOX	mg/kg	<5	<5	<5	<5	<5
Phenolics	mg/kg	17	<1	<1	<1	<1

mg/kg = milligrams per kilogram
 -- = Not Detected
 TOC = Total Organic Carbon
 TOX = Total Organic Halides

Table H5.2
Groundwater Analytical Results
IRP Phase II, Stage 1 - Confirmation/Quantification Study
OT-44 (AOC P)
Holloman AFB, New Mexico

Parameter	Unit	50W1	
		Result	DL
Arsenic	µg/L	<	10
Cadmium	µg/L	<	10
Nickel	µg/L	<	10
Lead	µg/L	<	10
Silver	µg/L	<	10
Chromium (hexavalent)	µg/L	<	4
Oil and grease	µg/L	140,000	600
TOC	µg/L	95,000	1,000
TOX	µg/L	120	10
Phenolics	µg/L	<	10

µg/L = micrograms per liter
 < = Not detected above the detection limit
 DL = Detection Limit
 TOC = Total Organic Carbon
 TOX = Total Organic Halides

Table H5.3
Soil Analytical Results
Phase II Remedial Investigation
OT-44 (AOC P)
Holloman AFB, New Mexico

Location	Residential	Industrial/ Occupational (µg/kg)	Construction	B1			B2			B3		
				2.5	5	10	2.5	5	10	2.5	5	10
VOCs (µg/kg)												
Benzene	27,000	73,600	157,000	--*	9	--	--	--	--	--	--	--
Chlorobenzene	176,000	242,000	242,000	--	--	--	--	40	--	--	--	--
Ethylbenzene	10,600,000	25,400,000	571,000,000	--	--	--	--	33	--	--	--	--
Styrene	419,000	419,000	419,000	--	5	--	--	--	--	--	--	--
Tetrachloroethene	9,830	24,600	97,600	--	39	5*	--	9	--	--	--	--
Toluene	248,000	248,000	248,000	--	6	--	--	9	--	--	--	--
Trichlorofluoromethane	528,000	959,000	959,000	--	374	83	--	39	103	--	--	--
BN/AE (µg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRPH (mg/kg)	1,000	NA	NA	526	--	--	--	7,946	--	--	--	--

Location	Residential	Industrial/ Occupational (µg/kg)	Construction	B4			B5			B6		
				5	7.5	10	12.5	15	17.5	2.5	5	20
VOCs (µg/kg)												
Benzene	27,000	73,600	157,000	--	--	--	NA	NA	NA	(--)	(--)	(--)
Chlorobenzene	176,000	242,000	242,000	--	--	--	NA	NA	NA	(--)	(--)	(--)
Ethylbenzene	10,600,000	25,400,000	571,000,000	--	--	--	NA	NA	NA	(--)	(--)	(--)
Styrene	419,000	419,000	419,000	--	--	--	NA	NA	NA	(--)	(--)	(--)
Tetrachloroethene	9,830	24,600	97,600	--	--	--	NA	NA	NA	(--)	(--)	(--)
Toluene	248,000	248,000	248,000	--	--	--	NA	NA	NA	(--)	(--)	(--)
Trichlorofluoromethane	528,000	959,000	959,000	--	--	--	NA	NA	NA	(--)	(--)	(--)
BN/AE (µg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	(--)	(--)*	(--)
TRPH (mg/kg)	1,000	NA	NA	--	--	--	--	--	--	(24)	(25)	(--)

µg/kg = micrograms per kilogram

() = Stage II Data

TRPH = total recoverable petroleum hydrocarbon

Results in **BOLD** exceeded the Base-specific TRPH limit of 1,000 mg/kg

mg/kg = milligrams per kilogram

* = Corps of Engineers lab data

VOC = volatile organic compound

-- = not detected

BN/AE = base neutrals/acid extractables

NA = not analyzed

**Table H5.4
Groundwater Analytical Results
Phase II Remedial Investigation
OT-44 (AOC P)
Holloman AFB, New Mexico**

	NMGWQ Standards	EPA MCL	Monitoring Well									
			STAGE I				STAGE II					
			MW 1	MW 2	MW 3	MW 4	MW 1	MW 2	MW 3	MW 4	MW 6	MW 6-D ⁽¹⁾
Volatiles (ug/L)												
1,1,1-Trichloroethane	60	200	22*	--	--	--	(--)	(--)	NA	NA	(--)	(--)
Trichloroethene	100	5	75*	--	--	--	(16)	(9)	NA	NA	(--)	(--)
1,1-Dichloroethane	25	--	7*	--	--	--	(--)	(--)	NA	NA	(--)	(--)
1,1-Dichloroethylene	5	7	2*	--	--	--	(--)	(--)	NA	NA	(--)	(--)
1,2-trans-Dichloroethylene	--	100	5*	--	--	--	(--)	(--)	NA	NA	(--)	(--)
Acid/Base/Neutral Extractables (ug/L)												
2,4-Dinitrotoluene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	(58)	(56)
Total Recoverable Petroleum Hydrocarbons (mg/L)												
	--	--	--	17	--	--	(--)	(9)	NA	NA	(2)	(2)

(1) Duplicate of MW-6
 NMGWQ = New Mexico Groundwater Quality
 EPA = United States Environmental Protection Agency
 MCL = Maximum Contaminant Level
 ug/L = micrograms per liter
 mg/L = milligrams per liter
 -- = Not detected
 () = Stage II data
 D = Field duplicate
 * = Corps of Engineers lab data
 NA = Not analyzed

Results in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and EPA Primary Drinking Water MCLs
 Results in **BOLD** exceed NMGWQ Standards for Human Health
 Results in *italics* exceed EPA MCLs

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Table H5.5
Soil Analytical Results
Phase II RCRA Facility Investigation
OT-44 (AOC P)
Holloman AFB, New Mexico

Location ID	Depth (feet)	TRPH	
		Result (mg/kg)	DL
44-B07	0.5-2.5	17,100	565
	2.5-4.5	30,700	791
	4.5-6.5	<	29
44-B08	1-3	<	29
	3-5	<	29
44-B09	1-3	<	29
	3-5	145	29
44-B10	1-3	<	31
	3-5	264	28
44-B11	1-3	156	26
	3-5	404	25
44-B12	1-3	70	26
	3-5	169	29

$\mu\text{g/kg}$ = micrograms per kilogram
 ft = feet
 < = Not detected at or above the detection limit
 DL = Detection limit
 TRPH = total recoverable petroleum hydrocarbons
 Results in **BOLD** exceed the Base-specific TPH action level of 1,000 mg/kg.

Table H5.6
Soil Analytical Results
Additional Soil Characterization Activities
OT-44 (AOC P)
Holloman AFB, New Mexico

Parameter	Units	OT-44-DP1		OT44-DP2		OT44-DP3	
		2-3	4-5	5-6	6-8	4-5	2-4
GRO	mg/kg	--	--	490	413	3 J	42
DRO	mg/kg	--	--	11,000	11,000	32	8,200
TRPH	mg/kg	--	--	19,100	12,600	74	12,500
Benzene	µg/kg	--	--	--	--	--	--
Toluene	µg/kg	--	--	--	--	--	--
Ethylbenzene	µg/kg	--	--	1,360	790	--	--
Xylene	µg/kg	--	--	810	550 J	--	--

-- = not detected

J = estimated value less than sample quantitation limit

GRO = gasoline-range total petroleum hydrocarbons

DRO = diesel-range total petroleum hydrocarbons

TRPH = total recoverable petroleum hydrocarbons

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

Values in **BOLD** indicate TRPH concentrations exceeding Base-specific TPH action level of 1,000 mg/kg

Table H5.7
Soil Analytical Results
Excavation Closure Verification Sampling
OT-44 (AOC P)
Holloman AFB, New Mexico

Sample ID	OT44-01-03	OT44-01-03 [^]	OT44-02-03	OT44-020-03 [^]	OT44-03-03	OT44-030-03 [^]	OT44-04-03	OT44-040-03 [^]
Date Sampled	3/17/1997	3/17/1997	3/17/1997	3/17/1997	3/17/1997	3/17/1997	3/17/1997	3/17/1997
TRPH - 418 1 (mg/kg)	260	520	46	49	<20	27	32	25
RPD (%)		67%		6.30%		30%		25%

Notes

< = Constituent not detected above laboratory quantitation limit

() = EPA Region VI risk-based criteria for industrial land use

NA = Not analyzed

ND = Not detected

NP = not present

¹ = Risk-based value above detected saturation point, value shown is residential land use risk-based concentration

RPD = Relative Percent Difference

[^] = Duplicate sample; acceptance limit is 50%

**Table H5.8
Groundwater Analytical Results
Biennial Groundwater Long Term Monitoring (1995 - 2001)
OT-44 (AOC P)
Holloman AFB, New Mexico**

Sampling Date	NMGWQ Standards	EPA MCL	S50-MW1				S50-MW2			
			Aug-95	Sep-97	Sep-99	Sep-01	Aug-95	Sep-97	Sep-99	Sep-01
VOCs (µg/L)										
Benzene	10	5	NS	--	--	--	--	1.2	--	--
sec-Butylbenzene	NP	NP	NS	--	NA	--	--	1.9 J	NA	--
Carbon disulfide	NP	NP	NS	--	--	--	11	2.6 J	5	--
Chloroform	100	NP	NS	0.76 J	--	--	--	--	--	--
Methylene chloride	100	NP	NS	--	--	--	--	7.2 UB	--	--
Toluene	750	1,000	NS	--	--	--	--	1.4	--	--
Trichloroethylene	100	5	NS	--	--	--	ND	ND	1 J	--

Sampling Date	NMGWQ Standards	EPA MCL	S50-MW3				S50-MW6 ⁽¹⁾			
			Aug-95	Sep-97	Sep-99	Sep-01	Aug-95	Sep-97	Sep-99	Sep-01
VOCs ¹ (µg/L)										
Benzene	10	5	NS	--	--	--	--	--	--	--
sec-Butylbenzene	NP	NP	NS	--	NA	--	--	--	NA	--
Carbon disulfide	NP	NP	NS	--	--	--	--	1.8 J	--	--
Chloroform	100	NP	NS	--	--	--	--	--	--	--
Methylene chloride	100	NP	NS	7.6 UB	--	--	--	7.1 UB	--	--
Toluene	750	1,000	NS	--	--	--	--	--	--	--
Trichloroethylene	100	5	NS	--	--	--	--	--	--	--

Notes

(1) Upgradient monitoring well

-- = not detected

NP = not provided

NMGWQ = New Mexico Groundwater Quality

NS = not sampled

VOC = volatile organic compound

EPA = United States Environmental Protection Agency

NA = not analyzed

µg/L = micrograms per liter

MCL = Maximum Contaminant Level

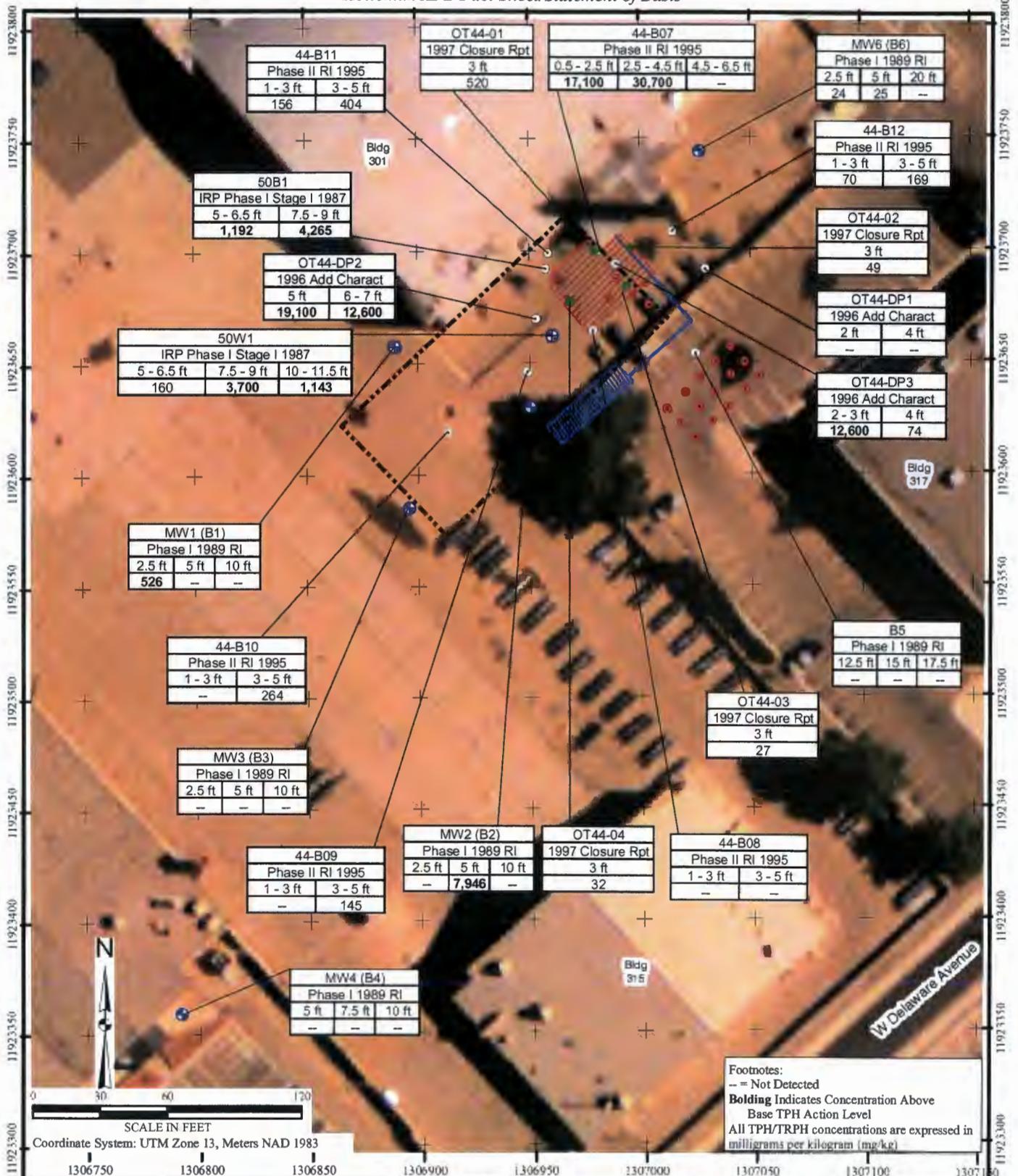
Laboratory Qualifiers - assigned as a result of laboratory data assessment procedures

J = Estimated value, less than CRDL but greater than or equal to IDL

UB = Qualifies as nondetect due to presence of analyte in associated laboratory blank

FIGURES

Holloman AFB Fact Sheet/Statement of Basis



File X:\AFC002\Holloman_AFB\TO37\Maps\
 SOB_7Sites\OT-44_tables.mxd
 Project: TT3001.02.01
 Revised: 04/04/08 TB
 Map Source: Holloman AFB



Legend

- Monitoring Well ○ Soil Boring
- Field Screened Soil Borings
- Excavation Verification Soil Sample
- Fuel Line
- - - - - SWMU Boundary (Base GIS)
- ▨ Excavation Area
- ▨ Former UST Location (Approximate Location)

Footnotes:
 - - = Not Detected
Bolding Indicates Concentration Above
 Base TPH Action Level
 All TPH/TRPH concentrations are expressed in
 milligrams per kilogram (mg/kg)

Figure H5.1
OT-44 (AOC-P)
Site Layout
Holloman AFB



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RON CURRY
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CINDY PADILLA
DEPUTY SECRETARY

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

June 26, 2007

Debbie Hartell, Chief
Environmental Flight
49th CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

**RE: NOTICE OF DEFICIENCY
REQUEST FOR NO FURTHER ACTION, OT-44 (AOC-P), JANUARY 2007
HOLLOMAN AIR FORCE BASE, EPA ID# NM6572124422
HWB-HAFB-07-004**

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed Holloman Air Force Base's (the Permittee) document entitled *Request for No Further Action, OT-44 (AOC-P)*, dated January 2007 (Request). The Permittee must address the following comments before NMED can make a final determination regarding the request.

1. In Section 3.3.2.1, the Permittee states that "[g]roundwater RI Stage I analytical results are presented in Table 3.4." Except for the TRPH value of 17 parts per million (ppm) in MW2, the data discussed in this paragraph are not presented in Table 3.4. The Permittee must revise and resubmit the table to include all Phase II Stage I groundwater analytical results.
2. In Section 3.3.7 (Final Closure Report Addendum), the Permittee states that "the excavation activities were conducted in an area where vadose zone soils contained TRPH concentrations above the former TPH action level of 1,000 mg/kg based on previous soil sampling activities." The Permittee must revise and resubmit this section to address the fact that the excavation did not include some areas where concentrations of oil and grease in soil collected at or below the water table were well above NMED's residential and

Debbie Hartell
June 26, 2007
Page 2 of 2

industrial soil screening levels. Specifically, the oil and grease concentrations at sampling locations 50B1 (1,192 ppm at 5 feet and 4,265 ppm at 7.5 feet) and OT44-DP2 (19,100 ppm at 5 feet and 12,600 ppm at 6 feet).

3. In Section 3.3.8, the Permittee states that "[i]n the NMED 2001 LTM report comment response letter, dated February 24, 2003, NMED had no comment on the proposed cessation of LTM activities at OT-44 (AOC P). Consequently, LTM activities at OT 44 ceased." This is incorrect. On page 3 of NMED's comment response letter, it states that "NMED concurs with the recommendation to discontinue long-term monitoring at OT-44 due to no VOCs detected during the last sampling event."
4. Table 3.6 (Soil Analytical Results, Additional Soil Characterization Activities) presents the TRPH data in µg/kg units while Figure 3.2 presents the data in mg/kg units. The Permittee must correct and resubmit the table to be consistent with the figure and the laboratory reports.

NMED concurs with the Permittee's conclusions and recommendations for OT-44 (AOC P). The recommendation is a no further action under NMED criterion 5. However, the Permittee must respond to the comments provided in this letter prior to initiating a Class 3 modification to its permit.

The Permittee must respond to this notice of deficiency within thirty (30) calendar days of receipt of this letter. If you have any questions regarding this matter or if you would like to discuss the comments prior to your response, please contact Darlene Goering of my staff at (505) 222-9504.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
W. Moats, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HWB
D. Tellez, EPA Region 6 (6PD-F)
File: HAFB 2007 and Reading
HWB-HAFB-07-004

Holloman AFB Fact Sheet/Statement of Basis

**Figure H5.2
NMED Approval Letter
June 26, 2007
Holloman AFB**

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Project: TT3001.02.01
Revised: 04/04/08 TH



Table H6.1
1989 IRP RI Soil Analytical Results
SS-46 (SWMU 130 and AOC S)
Holloman AFB, New Mexico

Analyses	NMED Soil Screening Levels ⁽¹⁾			Boring											
	Residential	Industrial/ Occupational	Construction Worker	B1			B2			B3					
				Depth:			2.5 ft	5 ft	14 ft	2.5 ft	5 ft	14 ft	2.5 ft	5 ft	14 ft
Benzene (µg/kg)	10,300	25,800	174,000	--**	--*	--	6*	--*	6*	5	5	8			
Chlorobenzene (µg/kg)	194,000	245,000	245,000	NA	--	NA	NA	--	NA	NA	2	NA			
Toluene (µg/kg)	252,000	252,000	252,000	NA	NA	--	NA	NA	5	NA	NA	--			
BN/AE (µg/kg)	NA	NA	NA	--	--	--	--	--	--	--	--	--			
TRPH (mg/kg)	1,000	1,000	1,000	--	--	--	--	--	--	--	32	--			
Lead (µg/kg)	400,000	800,000	800,000	400	900	900	1,100	1,000	900	--	--	--			

(1) NMED Soil Screening Levels, June 2006, Revision 4.0

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

ft = feet

NA = not analyzed/not applicable

-- = not detected

* = sample analyses outside QC limits - one surrogate out-of-range

** = Corps of Engineers lab data

TRPH = total recoverable petroleum hydrocarbons

BN/AE = base, neutral, acid extractables

IRP = Installation Restoration Program

RI = remedial investigation

Table H6.2
1989 IRP RI Groundwater Analytical Results
SS-46 (SWMU 130 and AOC S)
Holloman AFB, New Mexico

	NMGWQ Standard ⁽¹⁾	EPA MCL	Monitoring Well				
			MW1	MW1-D	MW2	MW3	MW4
Volatiles	NA	NA	(--)	(--)	(--)	(--)	(--)
Base/Neutral/Acid Extractables (µg/L)							
Bis(2-ethylhexyl)phthalate	--	6	32	<i>118</i>	--	--	NA
Butylbenzylphthalate	--	--	16	136	--	--	NA
Di-n-butylphthalate	--	--	142	672	--	--	NA
Dimethylphthalate	--	--	--	56	--	--	NA
TRPH (mg/L)	--	--	--	NA	--	4	NA
Lead (µg/L)	50	15 ⁽²⁾	4.5	3.1	2.5	<i>341</i>	NA
			<i>(16)</i>	<i>(19)</i>	(--)	(--)*	(--)*
Tentatively Identified Compounds (µg/L)							
3-methylpentane	--	--	(24)	(--)	(--)	(--)	(--)

(1) NMAC 20.6.2.3103

(2) Action Level

µg/L = micrograms per liter

mg/L = milligrams per liter

NMGWQ = New Mexico Groundwater Quality

EPA = United States Environmental Protection Agency

MCL = maximum contaminant level

TRPH = total recoverable petroleum hydrocarbons

NA = not analyzed/not applicable

D = field duplicate

() = stage II data

-- = not detected

* = Elevated detection limit (50 µg/L) due to matrix interference

NMAC = New Mexico Administrative Code

Results in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and EPA Primary Drinking Water MCLs

Results in **BOLD** exceed NMGWQ Standards for Human Health

Results in *italics* exceed EPA Primary Drinking Water MCLs

Table H6.3
Excavation Verification Sample Analytical Results
SS-46 (SWMU 130 and AOC S)
Holloman AFB, New Mexico

Sample ID	Location ⁽³⁾	TPH Concentration	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Fingerprinting
SOIL (mg/kg)								
NMED Soil Screening Levels - Residential ⁽¹⁾		1,000	10.3	252	128	82	388	NA
NMED Soil Screening Levels - Industrial/Occupational ⁽¹⁾		1,000	25.8	252	128	82	984	NA
NMED Soil Screening Levels - Construction Worker ⁽¹⁾		1,000	174	252	128	82	19,600	NA
N	6,740	33	--	--	0.033	0.070	NA	NP
S	9,340	<20	--	--	--	0.13	NA	NP
1	North Wall of Pit	32	--	--	--	--	--	Diesel (C11-C28)
2	East Side of Pit	500	--	--	--	--	--	Diesel (C9-C30)
3	South Side of Pit	>1,000⁽²⁾	NP	NP	NP	NP	NP	NP
4	West Side of Pit	>1,000⁽²⁾	NP	NP	NP	NP	NP	NP
5	South Side of Pit	590	--	--	0.63	0.30	NA	NP
6	West Side of Pit	<20	--	--	--	--	NA	NP
7	South Side of Pit	97	--	--	--	--	NA	NP
8	West Side of Pit	<5	--	--	--	--	--	--
9	Northeast Side of Pit	<5	--	--	--	--	--	--
S/W Tank Hole	South End by Tank Hole	9,000	9	64	48	110	NA	NP
GROUNDWATER (mg/L)								
NMED Soil Screening Levels - Tap Water ⁽¹⁾		1.72 ⁽⁴⁾	0.00349	2.27	1.34	0.203	0.0614	NA
Groundwater	Excavation	7	NP	NP	NP	NP	NA	NP

Notes:

- (1) NMED Soil Screening Levels, June 2006, Revision 4.0.
- (2) Analytical data not provided but concentration exceeded NMED-approved TPH action level of 1,000 mg/kg
- (3) Samples collected either at 3 of 7 feet bgs
- (4) Diesel #2 TPH Screening Guideline for Potable Water

mg/kg = milligrams per kilogram
 MTBE = methyl tertiary butyl ether
 NP = not provided

mg/L = milligrams per liter
 -- = not detected
 UST = underground storage tank

TPH = total petroleum hydrocarbons
 NA = not analyzed/not applicable
 NMED = New Mexico Environment Department

Bolded analyte concentration indicates concentration above one or more screening criteria.
 Shaded Sample IDs and associated locations indicate sample locations where additional excavation of the UST pit was conducted.

**Table H6.4
Groundwater LTM Analytical Results
SS-46 (SWMU 130 and AOC S)
Holloman AFB, New Mexico**

Well Number	NMGWQ Standard ⁽¹⁾	EPA MCL	MW-46-01					MW-46-02					
			Sep-97	Sep-99	Sep-01	Apr-03	Dec-05	Sep-97	Sep-99	Sep-01	Apr-03	Dec-05	
VOCs ⁽²⁾ (µg/L)													
Benzene	10	5	--	--	--	NA	--	--	--	--	NA	NA	
Bromodichloromethane	NA	NA	--	--	5.4	1.7	--	--	--	5.4	--	--	
Chloroform	100	NA	--	--	7.4	4.7	0.99	J	--	--	2.9	J	0.22 (J)
Methylene chloride	100	NA	--	--	1.2	J	--	--	--	--	--	--	--

Well Number	NMGWQ Standard ⁽¹⁾	EPA MCL	MW-46-03 ⁽³⁾				
			Sep-97	Sep-99	Sep-01	Apr-03	Dec-05
VOCs ⁽²⁾ (µg/L)							
Benzene	10	5	--	--	--	NA	0.52 J
Bromodichloromethane	NA	NA	--	--	--	--	--
Chloroform	100	NA	--	--	--	0.37 (J)	--
Methylene chloride	100	NA	--	--	--	--	--

(1) NMAC 20.6.2.3103

(2) Unless otherwise reported, no VOCs were detected using EPA Method 8260B.

(3) Upgradient monitoring well

µg/L = micrograms per liter

NMGWQ = New Mexico Groundwater Quality

EPA = United States Environmental Protection Agency

MCL = Maximum Contaminant Level

VOC = volatile organic compound

Qual = Qualifier

CRDL = Contract Required Detection Limit

IDL = Instrument Detection Limit

-- = not detected at or above method reporting limit

NA = not analyzed/not applicable

VOCs = volatile organic compounds

µg/L = micrograms per liter

(J) = Estimated value based on QC criteria

J = Estimated value detected less than the CRDL but greater than the reporting limit.

U = Compound was analyzed for but not detected. Analyte result was below the CRDL.

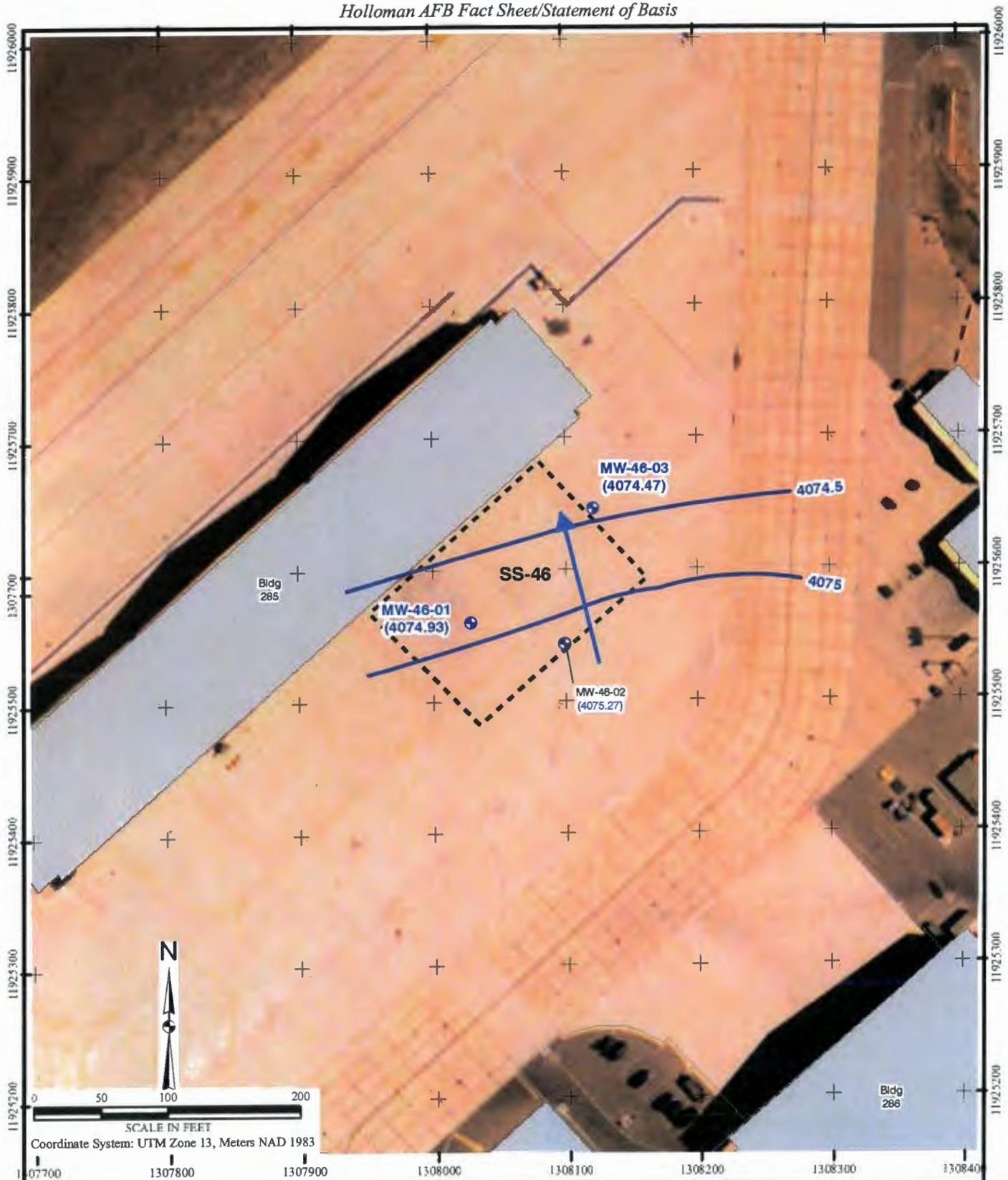
UJ = Estimated as non-detect at the detection limit.

**Table H6.5
TDS Summary Results
SS-46 (SWMU 130 and AOC S)
Holloman AFB, New Mexico**

Well ID	TDS (mg/L)			
	Second Quarter (June) 2002	Third Quarter (September) 2002	Second Quarter (March) FY2003	Dec-05
MW-46-01	6,740	7,580	6,960	8,380
MW-46-02	9,340	8,260	7,710	8,000
MW-46-03	7,760	7,440	7,380	6,390

Notes:
TDS = total dissolved solids
mg/L = milligrams per liter

FIGURES



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 SOB_7_Sites\SS-46_GW.mxd
 Project: TT3001.02.01
 Revised: 04/04/08 TB
 Map Source: Holloman AFB, bhate associates



Legend

-  SS-46 Site Boundary
-  Monitoring Well
-  4075 — Groundwater Elevation Contour 2005 (Feet Above Mean Sea Level)
-  ← Groundwater Flow Direction

Figure H6.1
SS-46
(AOC S/SWMU 130)
Site Layout
Holloman AFB



BILL RICHARDSON
GOVERNOR

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RON CURRY
SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

October 4, 2006

Ms. Debbie Hartell
Chief
Environmental Flight
49 CES/CEV
550 Tabosa Ave.
Holloman AFB, NM 88330-8458

SUBJECT: FINAL 2005 LONG-TERM GROUNDWATER MONITORING REPORT
HOLLOMAN AIR FORCE BASE, NEW MEXICO, MAY 2006
EPA ID# NM6572124422
HWB-HAFB-06-003

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed Holloman Air Force Base's (the Permittee's) "Final 2005 Long-Term Groundwater Monitoring Report" (LTM Report) and has the following Solid Waste Management Unit (SWMU)-specific comments.

1. **LF-01 – Main Base Landfill (SWMU 106)**

The LTM Report recommended the following: "The presence of benzene and manganese above the NM Groundwater Quality (NMGWQ) Standards in one monitoring well (S1-MW3) has triggered additional characterization associated with Site SS-02 and SS-05 to delineate the nature and extent. In accordance with the Class III Permit Modification for No Further Action (NFA) Status for seven Solid Waste Management Units at HAFB granted by the NMED on November 29, 2005, no additional characterization or monitoring is required at LF-01."

The NMED concurs with this recommendation. Therefore no long term monitoring (LTM) is required at this site at this time. Contamination in monitoring well S1-MW3 shall subsequently

Ms. Debbie Hartell
October 4, 2006
Page 2

be addressed by further investigation activities proposed by the Permittee at the adjoining site SS-02/SS-05.

2. **SS-02 and SS-05 – POL Spill Sites 1 and 2 (AOC-T)**

The LTM Report recommended the following: "A Voluntary Corrective Measures (VCM) Report summarizing soil remediation, additional groundwater characterization, and risk evaluation will be submitted to NMED in support of a NFA recommendation."

The NMED concurs with this recommendation.

3. **SD-08 – Refuse Collection Truck Washrack (SWMUs 4 and 82)**

The LTM Report recommended the following: "Manganese in wells MW-08-04 and MW-08-05 was the only contaminant detected above the NMGWQ Standard at SD-08 during the 2005 event. 1,2-Dichloroethane was detected in groundwater at MW-08-01 (73 µg/L) during the 2003 LTM event at a concentration greater than the NMGWQ Standard. This result was not confirmed during the 2005 event as the well was dry. SD-08 is recommended for closeout pending results of additional characterization to be performed in 2006."

The NMED concurs with this recommendation.

4. **OT-16 – Former Entomology Shop Area (SWMUs 118 and 132 and AOC-A)**

The LTM Report recommended the following: "The 2005 LTM Program concluded the fifth sampling event for site OT-16, satisfying the commitment to 10 years of LTM. It is therefore recommended that LFM cease. Although three VOCs and two pesticides were detected, all three were below the NMGWQ Standards. Furthermore, these compounds were present in the upgradient monitoring well. Therefore, OT-16 is also recommended for no further action. A report summarizing the RFIs and LTM program for this site will be submitted to NMED to further support the NFA recommendation."

The NMED does not concur with this recommendation. Gamma-BHC (Lindane) was detected in monitoring well 118-MW1601 at a concentration of 0.2 µg/L. This concentration equals the US Environmental Protection Agency's maximum contaminant level (EPA MCL) as per the National Primary Drinking Water Standards and, therefore, equals the standard set by the facility's permit. It should be noted that Lindane has not been detected in this well since LTM sampling began in September 1997. NMED acknowledges that this well is presently hydrologically upgradient of the source area. However, due to the close well spacing and the very low flow gradient, seasonal groundwater fluctuations could account for this well's groundwater being impacted by the source area. It should also be noted that total dissolved solids (TDS) concentrations in all wells at this site are below 10,000 mg/L.

Holloman AFB Fact Sheet/Statement of Basis

Figure H6.2
NMED Approval Letter
October 4, 2006
Holloman AFB

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Revised: 04/04/08 TH



Therefore, the Permittee is required to sample groundwater from all wells at this site for pesticides and TDS on a quarterly basis for eight consecutive quarters. The Permittee is required to submit a letter work plan confirming the scheduling of this sampling activity, including the methodologies to be used. This work plan shall be submitted within 30 days of the date of this letter. A decision on whether NFA status for this site is warranted will be made after the required quarterly sampling.

5. SS-17 – BX Service Station (AOC-O)

The LTM Report recommended the following: "Contaminated soil removal is underway and will be completed in 2008. Upon conclusion of this removal, a Voluntary Corrective Measures Report summarizing soil remediation, nature and extent of groundwater conditions, and risk evaluation will be submitted to NMED to support further decisions with regard to this site."

The NMED concurs with this recommendation.

6. LF-21 – West Area Landfill No. 2 (SWMU 116)

The LTM Report recommended the following: "The 2005 LTM Program concluded its sixth sampling event for LF-21, representing over 10 years of LTM, satisfying the Decision Document commitment. Manganese detected in well MW-21-02 was the only contaminant detected above the NMGWQ Standards at LF-21 during the 2005 event. It is recommended that LTM cease. Supplemental characterization work is being performed this year in accordance with the July 2005 HydroGeoLogic RFI work plan, as amended in response to NMED comments, to support future decisions with regard to LF-21."

The NMED concurs with this recommendation.

7. LF-29 – Former Army Landfill (SWMU 104)

The LTM Report recommended the following: "This round completes 10 years of LTM at LF-29 and it is recommended that LTM cease. Additional characterization work to support future decisions with regard to LF-29 is being performed this year in accordance with the July 2005 HydroGeoLogic RFI work plan, as amended in response to NMED comments."

The NMED concurs with this recommendation.

8. DP-30 and SD-33 – Grease Trap Disposal Pits (SWMU 113B)

The LTM Report recommended the following: "Supplemental characterization work is being performed this year in accordance with the July 2005 HydroGeoLogic RFI work plan, as amended in response to NMED comments. This characterization includes continued groundwater sampling on a semi-annual basis for VOCs, metals and TDS."

The NMED concurs with this recommendation.

9. SS-39 – Missile Fuel Spill Area (SWMUs 165, 177, 179 and 181)

The LTM Report recommended the following: "Supplemental characterization work is being performed this year in accordance with the July 2005 HydroGeoLogic RFI work plan, as amended in response to NMED comments. This characterization includes continued groundwater sampling on a semi-annual basis for VOCs, RCRA metals, perchlorate and TDS."

The NMED concurs with this recommendation.

10. SS-46 – JP-4 Spill Site (SWMU 130)

The LTM Report recommended the following: "The 2005 LTM Program concluded the fifth sampling event for site SS-46 and 10 years of monitoring. It is recommended that LTM cease. Furthermore, VOCs were not detected above the CRDLs and SS-46 is recommended for No Further Action under NMED Criterion 5."

The NMED concurs with this recommendation.

11. SS-48 – Military Gas Station (AOC-N)

The LTM Report recommended the following: "The 2005 LTM Program concluded the sixth sampling event for site SS-48 and over 10 years of LTM. Therefore, it is recommended that LTM cease. Although benzene was detected above the NMGWQ Standards in one monitoring well (S55-MW5), SS-48 is recommended for NFA. The TDS concentrations in four of the six wells were above 10,000 mg/L. It is hypothesized that the two wells with TDS concentrations below 10,000 mg/L are artificially low due to the dilution of natural groundwater from leaking water lines and surface irrigation from the domestic water supply. In conclusion, the NMGWQ Standard for TDS does not apply because SS-48 groundwater in its natural state would have TDS concentrations greater than 10,000 mg/L. Therefore, the groundwater is not a potential domestic or agricultural water supply."

The NMED does not concur with the recommendation that LTM cease and the site be considered for NFA status. Nor does the NMED agree with the conclusion that TDS concentrations in groundwater above 10,000 mg/L necessarily negate application of NM Water Quality Control Commission (NMWQCC) groundwater standards. Evaluation of potential risks from exposure pathways (e.g. vapor inhalation or construction worker exposure) will be deemed necessary for contaminants above NMWQCC Standards, regardless of TDS concentrations. The NMED also does not agree that the NMWQCC Standards do not apply to groundwater with TDS concentrations below 10,000 mg/L where this condition appears "artificially low due to dilution"

Holloman AFB Fact Sheets/Statement of Basis

**Figure H6.2 (Cont.)
NMED Approval Letter
October 4, 2006
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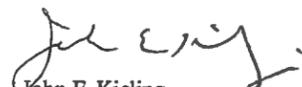
Ms. Debbie Hartell
October 4, 2006
Page 5

of natural groundwater". If TDS concentrations are below 10,000 mg/L, the NMWQCC Standards will apply, regardless of hypothetical reasons for the lower concentrations.

The Benzene concentration in well S55-MW5 during this LTM event was 83 µg/L. The NMWQCC Standard is 10 µg/L. Benzene concentrations in this well have been above the NMWQCC Standard since September 1999. The TDS concentrations in this well during the 2005 LTM event were above 10,000 mg/L. In addition, the concentration of Methyl tertbutyl ether (MTBE) in well S55-MW5 was 419 µg/L and the MTBE concentration in well S55-MW7 was 161 µg/L. Although there are no NMWQCC Standards or EPA MCLs for MTBE in groundwater, the calculated standard as specified in the facility permit is 131 µg/L and the NM Environmental Improvement Board Standard for groundwater remediation is 100 µg/L (reference 20.5.12.1233 (a)(2) NMAC). These concentrations are exceeded in both wells. The TDS concentrations in these wells during the 2005 LTM event were above 10,000 mg/L. Therefore, the Permittee is required to conduct a risk assessment for volatile organic compounds, particularly Benzene and MTBE, evaluating the vapor inhalation and construction worker exposure pathways in the vicinity of this site. The Permittee is required to submit a letter work plan confirming the scheduling of this evaluation, including methodologies to be used. This work plan shall be submitted within 30 days of the date of this letter. A decision on whether NFA status or further LTM for this site is warranted will be made after the required risk assessment.

If you have any questions regarding this matter, please contact David Strasser of my staff at (505) 222-9526 or at the above address.

Sincerely,


John E. Kieling
Manager
Permits Management Program

JEK:dcs

Ms. Debbie Hartell
October 4, 2006
Page 6

cc: J. Bearzi, NMED, HWB
W. Moats, NMED, HWB
C. Amindyas, NMED, HWB
D. Strasser, NMED, HWB
D. Tellez, EPA, Region 6 (6PD-F)
D. Griffin, HAFB
File: HAFB, 2006 and Reading
HWB-HAFB-06-003 (2005 LTM Report)
HWB-HAFB-05-003 (SD-08 RFI WP)
HWB-HAFB-05-004 (SS-02/SS-05 RFI WP)
HWB-HAFB-05-006 (LF-21, LF-29, DP-30/SD-33 and SS-39 RFI WP)

Holloman AFB Fact Sheet/Statement of Basis

**Figure H6.2 (Cont.)
NMED Approval Letter
October 4, 2006
Holloman AFB**

Filename: X:\AFC002\Holloman_AFB\TO37\Maps\
SOB_7_Sites\Letter3_P5-6.cdr
Project: TT3001.02.01
Revised: 02/28/08 TH



H.7 SS-48 (AOC N) MILITARY GAS STATION TANK

H.7.1 Location/Unit Description

SS-48 is located in the southeastern portion of Holloman AFB off of Ocotillo Avenue between Connecticut Avenue and Colorado Avenue. The location of the site in relation to the surrounding facility is depicted on Figure A2. A site layout map is included as Figure H7.1. Associated permanent facilities are three 12,000-gallon USTs (Tank Numbers 1, 2, and 3), a pumphouse, and a dispensing island. A vehicle washrack is also located on site. Groundwater occurs approximately 15 feet bgs. The hydraulic gradient is toward the south.

H.7.2 History/Current and Anticipated Future Land Use

In 1986, it was reported that water was found in former Tank No. 2. The water was pumped out; however, water was found in the tank again about a week later. An integrity test confirmed that the tank had a leak and use of the tank was discontinued. One of the base personnel working at the gas station believed that water was leaking into the top of the tank from the adjacent washrack. During a 1989 RI (Walk Haydel, 1989a), seven monitoring wells were installed and soil samples from each monitoring well borehole were collected. Upon completion of the monitoring wells, groundwater samples were collected from all seven monitoring wells. Both the soil and groundwater samples were analyzed for VOCs, TRPH, and lead. No analytes were detected above screening criteria in the soil samples. The groundwater samples contained benzene, toluene, tetrachloroethene, TCE, and lead above screening criteria in two of the seven wells. The soil and groundwater analytical results of the 1989 RI are provided as Tables H7.1 and H7.2, respectively.

A BRA was conducted for the site and concluded that the site posed no significant threat to human health or the environment (Walk Haydel, 1989b). A Decision Document (Walk Haydel, 1990) was signed by the Base and NMED in April 1993 to support site close-out of SS-48, and the USTs were subsequently removed in 1993 (USAF, 2003). The decision document stated that Site SS-48 presented no significant public health or environmental risk.

The current and anticipated future land use is industrial.

H.7.3 Evaluation of Relevant Information

Biennial groundwater LTM activities were initiated in 1995 and continued until 2005. LTM sampling consisted of gauging and collecting groundwater samples from six of the seven onsite monitoring wells with one well (S55-MW3) added to the LTM program in 2003 based on a request from Holloman AFB. Groundwater samples in December 2005 were analyzed for VOCs (Table H7.3) and TDS (Table H7.4) (Bhate, 2006). Historical groundwater LTM analytical results are also included on Table H7.3. Eight VOCs were detected above the CRDLs in the six groundwater samples collected from the SS-48 monitoring well network. The most frequently detected VOCs were chloroform, MTBE, and TCE. TCE, the most widely distributed VOC constituent, was detected in five of the wells sampled with concentrations ranging from 1.2 to 25.2 µg/L. The highest concentrations were found in wells upgradient and cross-gradient of the site. All concentrations of TCE were below the NMGWQ standard. Chloroform was detected in four wells (S55-MW-2, S55-MW-3, S55-MW-4, and S55-MW-6) with concentrations ranging

from 1.4 to 4.0 µg/L. These concentrations are also below the NMGWQ standard. MTBE was detected in S55-MW5 and S55-MW7 with concentrations of 419 and 161 µg/L respectively. There is no NMGWQ standard for this compound.

Benzene was detected in monitoring well S55-MW5 with a concentration of 83.0 µg/L. This concentration is greater than the NMGWQ standard (10 µg/L). However, the concentration of benzene detected in 2005 was less than the concentrations of benzene detected in 2003 (100 µg/L) and 2001 (560 µg/L) at S55-MW5, exhibiting a decreasing trend. The detections of 1,2-dichloroethane (1.1 µg/L in S55-MW7) and ethylbenzene (6.8 µg/L in S55-MW5) were both below the NMGWQ standards. In addition, there were low concentrations of sec-butylbenzene (1.4 µg/L) and isopropylbenzene (1.4 µg/L) detected in the sample collected from S55-MW5. There are no NMGWQ standards for these compounds. In general the concentrations of VOCs were lower than the concentrations previously detected at SS-48. This was the first time that monitoring well S55-MW6 had been sampled under the LTM program. TDS concentrations ranged from 6,110 to 12,100 mg/L.

Although benzene was detected above the NMGWQ standards in one well (S55-MW5), cessation of LTM activities and NFA was recommended, since TDS concentrations in wells containing contaminants were above 10,000 mg/L, indicating that the underlying groundwater was not a potential domestic or agricultural water supply. NMED reviewed the 2005 LTM report and responded in an October 4, 2006, comment letter (provided as Figure H6.2), indicating that a risk assessment was required for VOCs (particularly benzene and MTBE) that would evaluate the vapor inhalation and construction work exposure pathways in the vicinity of the site before deciding whether NFA status or further LTM is warranted (NMED, 2006).

Holloman AFB addressed the VOC risk assessment requirement in a Response to Comment letter on November 14, 2006. The risk assessment utilized the Tier 1 risk-based screening levels for these receptors and pathways in the New Mexico Risk Based Decision Making (NMRBDM) process set forth in the *New Mexico Underground Storage Tank Bureau Guidelines for Corrective Action, March 13, 2000*. The Tier 1 screening levels are criteria developed using default exposure assumptions presented in the Guidelines. The NMRBDM process directs that contaminant concentrations in applicable media for appropriate receptors be compared to these screening levels. If these levels are exceeded, remediation or proceeding to a site-specific Tier 2 risk evaluation would be the next course of action. NMED may approve NFA status if the site satisfies the requirements of 20 NMAC 5.12.1227. These requirements include but are not limited to:

- Representative concentrations for each medium meet the criteria established in accordance with 20 NMAC 5.12 and the maximum concentration in each medium does not exceed the representative concentration by a factor of 10,
- No nuisance conditions exist at the site,
- Non-aqueous phase liquids (NAPLs) and contaminant-saturated soils have been removed or remediated,
- The bureau agrees with the overall Tier 1 evaluation, and
- The overall size of the plume is shrinking, based on concentration trends observed in the monitoring wells.

SS-48 contaminant concentrations were, therefore, compared to the Tier 1 risk-based screening levels (RBSLs) to determine whether NFA or further evaluation using a Tier 2 risk assessment was warranted. Initial screening against standards resulted in the requirement to evaluate benzene, ethylbenzene, and MTBE with respect to the RBSLs. Although the site and its surrounding area are defined as commercial in accordance with Section 4.3.1 of the corrective action guidance document, benzene, ethylbenzene, and MTBE were compared to both residential and commercial groundwater indoor inhalation RBSLs, provided in Tables 4-17 and 4-18, respectively, of the guidance document. In addition, concentrations were also compared to the construction worker groundwater outdoor inhalation RBSLs located in Table 4-19 of the corrective action guidance document (NM USTB, 2000). Based on direct comparison, none of the three contaminants have historically been (or currently are) detected at concentrations exceeding these RBSLs. All concentrations were several orders of magnitude below Tier 1 RBSLs. The site also satisfied the other criteria of 20 NMAC 5.12.1227, namely no nuisance conditions exist at the site, there are no NAPL and contaminant saturated soils present, and contaminant concentrations have decreased over time. Based on the evaluation and the satisfaction of the criteria, cessation of LTM and NFA was requested under NMED Criterion 5. NMED concurred in a comment letter dated 1 March 2007. A copy of the comment letter is included as Figure H7.2.

H.7.4 Basis for Determination

NMED concurred with the 2005 LTM report and subsequent risk assessment conclusion that AOC N (SS-48) is suitable for NFA based on NMED Criterion 5; the SWMU and AOC have 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.

H.7.5 References

- Bhate Environmental Associates, Inc., 2006. 2005 Long-Term Groundwater Monitoring Report, Holloman Air Force Base, New Mexico. March.
- New Mexico Environment Department (NMED), 2006. Comment letter on the Final 2005 Long-Term Groundwater Monitoring Report, Holloman Air Force base, New Mexico, May 2006, EPA ID#NM6572124422, HWB-HAFB-06-003. October 4.
- New Mexico Underground Storage Tank Bureau (NM USTB), 2000. New Mexico Underground Storage Tank Bureau Guidelines for Corrective Action. March.
- United States Air Force (USAF), 2003. Management Action Plan, Public Version, Holloman Air Force Base, New Mexico. December.
- Walk Haydel and Associates, Inc. (Walk, Haydel), 1989a. Installation Restoration Program Remedial Investigation, Final Baseline Risk Assessment. December.
- Walk Haydel, 1989b. Installation Restoration Program Remedial Investigation Final Remedial Investigation Report, Holloman Air Force Base, New Mexico, Volume I. December.

Walk Haydel, 1990. Installation Restoration Program, Holloman Air Force Base, New Mexico, Decision Documents, Site LF-01 (Old Site 1) – Main Base Landfill; Site LF-10 (Old Site 10) – Old Main Base Landfill; Site SD-25 (Old Site 25) – Drainage Lagoon; Site FT-31 (Old Site 31) – Fire Department Training Area; Site OT-44 (Old Site 50) – Building 301, Aircraft Maintenance Hangar; Site SS-46 (Old Site 53) – JP4 Underground Waste Tank; and Site SS-48 (Old Site 55) – Military Gas Station. November.

TABLES

Table H7.1
Soil Risk Based Screening
SS-48 (AOC-N)
Holloman AFB, New Mexico

Analyte	Risk Based Screening Levels			B1						B2					
	Residential Indoor Inhalation ⁽¹⁾	Commercial Worker Indoor Inhalation ⁽²⁾	Soil within Construction Zone ⁽³⁾	Sample Depth (feet)						Sample Depth (feet)					
				2.5	5	7.5	10	12.5	20	2.5	5	7.5	10	12.5	20
Volatiles															
Benzene (µg/kg)	20.7	128	167,000	--	--	NA	NA	--	NA	--	--	NA	NA	--	NA
Ethylbenzene (µg/kg)	36,900	402,000	5,980,000	--	--	NA	NA	--	NA	--	--	NA	NA	--	NA
Toluene (µg/kg)	1,880	20,500	6,310,000	NA	--	NA	NA	--	NA	NA	--	NA	NA	--	NA
Total Xylenes (µg/kg)	2,590	28,200	8,000,000	NA	--	NA	NA	--	NA	NA	--	NA	NA	--	NA
BN/AE (µg/kg)	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRPH (mg/kg)	520 ⁽⁴⁾	520 ⁽⁴⁾	--	307	--	NA	NA	--	NA	--	--	NA	NA	--	NA
Lead (µg/kg)	N/A	N/A	1,000,000	5	5	NA	NA	3.2	NA	--	0.8	NA	NA	1.3	NA

Analyte	Risk Based Screening Levels			B3						B4					
	Residential Indoor Inhalation ⁽¹⁾	Commercial Worker Indoor Inhalation ⁽²⁾	Soil within Construction Zone ⁽³⁾	Sample Depth (feet)						Sample Depth (feet)					
				2.5	5	7.5	10	12.5	20	2.5	5	7.5	10	12.5	20
Volatiles															
Benzene (µg/kg)	20.7	128	167,000	74	85**	NA	NA	--	NA	NA	(--)	NA	(--)	NA	(--)
Ethylbenzene (µg/kg)	36,900	402,000	5,980,000	31	134	NA	NA	--	NA	NA	NA	NA	(--)	NA	(--)
Toluene (µg/kg)	1,880	20,500	6,310,000	8	41	NA	NA	--	NA	NA	NA	NA	(--)	NA	(--)
Total Xylenes (µg/kg)	2,590	28,200	8,000,000	11	335	NA	NA	--	NA	NA	NA	NA	(--)	NA	(--)
BN/AE (µg/kg)	--	--	--	NA	NA	NA	NA	NA	NA	NA	(--)	NA	(--)	NA	(--)
TRPH (mg/kg)	520 ⁽⁴⁾	520 ⁽⁴⁾	--	--	36	NA	NA	--	NA	NA	(--)	NA	(--)	NA	(12)
Lead (µg/kg)	N/A	N/A	1,000,000	--	2	NA	NA	3.9	NA	NA	(--)	NA	(5)	NA	(3)

Table H7.1 (continued)
Soil Risk Based Screening
SS-48 (AOC-N)
Holloman AFB, New Mexico

Analyte	Risk Based Screening Levels			B5						B6					
	Residential Indoor Inhalation ⁽¹⁾	Commercial Worker Indoor Inhalation ⁽²⁾	Soil within Construction Zone ⁽³⁾	Sample Depth (feet)						Sample Depth (feet)					
				2.5	5	7.5	10	12.5	20	2.5	5	7.5	10	12.5	20
Volatiles															
Benzene (µg/kg)	20.7	128	167,000	NA	(--)	(--)	NA	NA	(--)	NA	(--)	(--)	NA	NA	(--)
Ethylbenzene (µg/kg)	36,900	402,000	5,980,000	NA	NA	(--)	NA	NA	(--)	NA	NA	(--)	NA	NA	(--)
Toluene (µg/kg)	1,880	20,500	6,310,000	NA	NA	(--)	NA	NA	(--)	NA	NA	(--)	NA	NA	(--)
Total Xylenes (µg/kg)	2,590	28,200	8,000,000	NA	NA	(--)	NA	NA	(--)	NA	NA	(--)	NA	NA	(--)
BN/AE (µg/kg)	--	--	--	NA	NA	(--)	(--)	NA	(--)	NA	(--)#	(--)*	NA	NA	(--)*
TRPH (mg/kg)	520 ⁽⁴⁾	520 ⁽⁴⁾	--	NA	(--)	(15)	NA	NA	(14)	NA	(16)	(--)	NA	NA	(--)
Lead (µg/kg)	N/A	N/A	1,000,000	NA	(--)	(2)	NA	NA	(4)	NA	(1)	(3)	NA	NA	(4)

Analyte	Risk Based Screening Levels			B7					
	Residential Indoor Inhalation ⁽¹⁾	Commercial Worker Indoor Inhalation ⁽²⁾	Soil within Construction Zone ⁽³⁾	Sample Depth (feet)					
				2.5	5	7.5	10	12.5	20
Volatiles									
Benzene (µg/kg)	20.7	128	167,000	NA	(--)	NA	NA	NA	(--)
Ethylbenzene (µg/kg)	36,900	402,000	5,980,000	NA	NA	NA	NA	NA	(--)
Toluene (µg/kg)	1,880	20,500	6,310,000	NA	NA	NA	NA	NA	(--)
Total Xylenes (µg/kg)	2,590	28,200	8,000,000	NA	NA	NA	NA	NA	(--)
BN/AE (µg/kg)	--	--	--	(--)*	(--)*	NA	NA	NA	(--)*
TRPH (mg/kg)	520 ⁽⁴⁾	520 ⁽⁴⁾	--	(--)	(--)	NA	NA	NA	(--)
Lead (µg/kg)	N/A	N/A	1,000,000	(--)	(1)	NA	NA	NA	(9)

Table H7.1 (continued)
Soil Risk Based Screening
SS-48 (AOC-N)
Holloman AFB, New Mexico

^ Soil analytical data summarized from 1989 IRP Remedial Investigation (Walk Haydel, 1989a)

^ Boring locations correspond to monitoring well locations

(1) Obtained from Table 4-17 of the Guidance on Corrective Action (NMED, 2000)

(2) Obtained from Table 4-18 of the Guidance on Corrective Action (NMED, 2000)

(3) Obtained from Table 4-19 of the Guidance on Corrective Action (NMED, 2000)

(4) NMED residential Screening Guideline value for diesel (NMED, 2005)

µg/kg = micrograms per kilogram

RI = Remedial Investigation

NA = Not Analyzed

N/A = not applicable

BN/AE = Base Neutrals/Acid Extractables

TRPH = Total Recoverable Petroleum Hydrocarbons

-- = Not Detected/Not Applicable

() = Stage II data

* = Acid extractables not valid due to out-of-range surrogate recoveries

** = Outside QC limits-one surrogate recover out-of-range

= Corps of Engineers lab data

Italicized values indicate an analyte concentration above residential subsurface soil indoor inhalation risk-based screening level for the respective analyte.

Table H7.2
Phase 1 1998 RI Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Analyses	NMGWQ Standard (µg/L)	EPA MCL (µg/L)	MW1	(MW1)	MW2	(MW2)	MW3	MW3 (Stage II)	MW4	MW5	MW5-D	MW6	MW7
Volatiles (µg/L)													
Acetone	--	--	--	(--)	NA	(--)	(16)	NA	(--)	(--)	NA	(--)*	(--)
Benzene	10	5	--	(--)	NA	(--)	(15)	NA	(--)	(--)	NA	(--)	(--)
Tetrachloroethene	20	5	--	<i>(18)</i>	NA	(--)	(--)	NA	(--)	(--)	NA	(--)	(--)
Toluene	750	1000	--	(--)	NA	(--)	(6)	NA	(--)	(--)	NA	(--)	(--)
Total Xylenes	620	10000	--	(--)	NA	(--)	(1300)	NA	(--)	(--)	NA	(--)	(--)
Trichloroethene	100	5	17	(--)	NA	(--)	<i>(7)</i>	NA	(--)	(--)	NA	(--)	(--)
BN/AE (µg/L)													
Acenaphthene	--	--	NA	--**	NA	(--)	(14)	NA	(--)	(--)	NA	(--)	(--)
Bis(2-ethylhexyl)phthalate	--	6	NA	--	NA	(--)	(--)	NA	(--)	(--)	NA	(--)	(--)
Fluorene	--	--	NA	--	NA	(--)	(10)	NA	(--)	(--)	NA	(--)	(--)
2-Methylnaphthalene	--	--	NA	--	NA	(--)	(63)	NA	(--)	(--)	NA	(--)	(--)
Naphthalene	--	--	NA	--	NA	(--)	(235)	NA	(--)	(--)	NA	(--)	(--)
Nitrobenzene	--	--	NA	--	NA	(15)	(--)	NA	(--)	(--)	NA	(--)	(--)
Phenanthrene	--	--	NA	--	NA	(--)	(22)	NA	(--)	(--)	NA	(--)	(--)
TRPH (mg/L)	--	--	--	--	4.3	(--)	--	(3)	(--)	(--)	NA	(--)	(3)
Lead (µg/L)	50	15 ⁽¹⁾	34.7	<i>(46)</i>	--	(--)	<i>17.2</i>	<i>(18)</i>	(63)	<i>(42)</i>	(65)	<i>(16)</i>	<i>(46)</i>
Tentatively Identified Compounds (µg/L)													
2-Butene	--	--								<i>(34)</i>	<i>(30)</i>		
2-methoxy-2-methyl propane	--	--								<i>(95)</i>	<i>(86)</i>		

Notes:

¹Action Level

µg/L = micrograms per liter

MCL = Maximum Contaminant Level

() = Stage II Data

** = Corps of Engineers lab data

NMGWQ = New Mexico Groundwater Quality

TRPH = Total Recoverable Petroleum Hydrocarbon

NA = Not Analyzed

D = Field Duplicate

EPA = United States Environmental Protection Agency

-- = Not detected/Not applicable

* = Outside QC limits -- one surrogate out-of-range

Results in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and EPA Primary Drinking Water MCLs

Results in **BOLD** exceed NMGWQ Standards for Human Health

Results in *italics* exceed EPA Primary Drinking Water MCLs

Table H7.3
LTM Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Well Number	NMGWQ Standard (µg/L)	EPA MCL (µg/L)	S55-MW2 ²											
			Aug-95		Sep-97		Sep-99		Sep-01		Apr-03		Dec-05	
Sampling Date			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs¹(µg/L)														
Acetone	--	--	ND	U	ND	U	< 5	U	< 5	U	< 10	U	ND	
Benzene	10	5	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Bromodichloromethane	--	--	ND	U	1.3	J	< 3	U	< 5	U	< 1	U	ND	
2 - Butanone	--	--	ND	U	ND	U	< 5	U	< 5	U	< 10	U	ND	
tert-Butylmethyl ether	--	--	ND	U	ND	U	NA		< 5	U	< 1	U	ND	
Carbon disulfide	--	--	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
Chloroform	100	--	ND	U	2.6	J	2	J	< 5	U	1.1		2.8	
cis-1,2-dichloroethene	--	70	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,1-dichloroethene	5	7	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,2-dichloroethane	10	5	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Ethylbenzene	750	700	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Methylene chloride	100	--	ND	U	1.7	UB	< 3	U	< 5	U	< 2	U	ND	
Tetrachloroethene	20	5	ND	U	ND	U	ND	U	ND	U	2.3		ND	
1,1,1-Trichloroethane	60	200	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Trichloroethylene	100	5	6.6		ND	U	< 3	U	< 5	U	24		10.4	
Toluene	750	1,000	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Styrene	--	100	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
o-Xylene	620 ³	10,000 ³	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
m,p-Xylenes	620 ³	10,000 ³	ND	U	ND	U	< 3	U	< 10	U	< 2	U	ND	
Freon 113														

Table H7.3 (continued)
LTM Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Well Number	NMGWQ Standard (µg/L)	EPA MCL (µg/L)	S55-MW3											
			Aug-95		Sep-97		Sep-99		Sep-01		Apr-03		Dec-05	
Sampling Date			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs¹(µg/L)														
Acetone	--	--	NA		NA		NA		NA		< 10	U	ND	
Benzene	10	5	NA		NA		NA		NA		0.38	(J)	ND	
Bromodichloromethane	--	--	NA		NA		NA		NA		< 1	U	0.57	J
2 - Butanone	--	--	NA		NA		NA		NA		< 10	U	ND	
tert-Butylmethyl ether	--	--	NA		NA		NA		NA		7.7		ND	
Carbon disulfide	--	--	NA		NA		NA		NA		< 1	U	ND	
Chloroform	100	--	NA		NA		NA		NA		1.5		4	
cis-1,2-dichloroethene	--	70	NA		NA		NA		NA		0.21	(J)	ND	
1,1-dichloroethene	5	7	NA		NA		NA		NA		0.41	(J)	ND	
1,2-dichloroethane	10	5	NA		NA		NA		NA		< 1	U	ND	
Ethylbenzene	750	700	NA		NA		NA		NA		1.4		ND	
Methylene chloride	100	--	NA		NA		NA		NA		< 2	U	ND	
Tetrachloroethene	20	5	NA		NA		NA		NA		0.24	(J)	ND	
1,1,1-Trichloroethane	60	200	NA		NA		NA		NA		< 1	U	ND	
Trichloroethylene	100	5	NA		NA		NA		NA		29		13	
Toluene	750	1,000	NA		NA		NA		NA		< 1	U	ND	
Styrene	--	100	NA		NA		NA		NA		< 1	U	ND	
o-Xylene	620 ³	10,000 ³	NA		NA		NA		NA		6.2		ND	
m,p-Xylenes	620 ³	10,000 ³	NA		NA		NA		NA		6.6		ND	
Freon 113														

Table H7.3 (continued)
LTM Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Well Number	NMGWQ Standard (µg/L)	EPA MCL (µg/L)	S55-MW4											
			Aug-95		Sep-97		Sep-99		Sep-01		Apr-03		Dec-05	
Sampling Date			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs¹(µg/L)														
Acetone	--	--	ND	U	ND	U	< 5	U	< 5	U	< 10	U	ND	
Benzene	10	5	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Bromodichloromethane	--	--	ND	U	2.2	J	< 3	U	< 5	U	< 1	U	ND	
2 - Butanone	--	--	ND	U	ND	U	< 5	U	< 5	U	< 10	U	ND	
tert-Butylmethyl ether	--	--	ND	U	ND	U	NA		< 5	U	< 1	U	ND	
Carbon disulfide	--	--	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
Chloroform	100	--	ND	U	2.4	J	< 3	U	< 5	U	0.64	(J)	1.4	
cis-1,2-dichloroethene	--	70	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,1-dichloroethene	5	7	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,2-dichloroethane	10	5	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Ethylbenzene	750	700	ND	U	0.81	J	< 3	U	< 5	U	< 1	U	ND	
Methylene chloride	100	--	ND	U	1.6	UB	< 3	U	< 5	U	< 2	U	ND	
Tetrachloroethene	20	5	ND	U	ND	U	ND	U	ND	U	0.33	(J)	ND	
1,1,1-Trichloroethane	60	200	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
Trichloroethylene	100	5	ND	U	ND	U	< 3	U	< 5	U	1.1		25.2	
Toluene	750	1,000	ND	U	1.2		< 3	U	< 5	U	< 1	U	ND	
Styrene	--	100	ND	U	ND	U	< 3	U	< 5	U	< 1	U	ND	
o-Xylene	620 ³	10,000 ³	ND	U	0.74	J	< 3	U	< 5	U	< 1	U	ND	
m,p-Xylenes	620 ³	10,000 ³	ND	U	2.1		< 3	U	< 10	U	< 2	U	ND	
Freon 113													0.63	J

Table H7.3 (continued)
LTM Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Well Number	NMGWQ Standard. (µg/L)	EPA MCL (µg/L)	S55-MW5											
			Aug-95		Sep-97		Sep-99		Sep-01		Apr-03		Dec-05	
Sampling Date			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs¹(µg/L)														
Acetone	--	--	ND	U	ND	U	4	J	< 50	U	< 10	U	19.4	J
Benzene	10	5	38		ND	U	170	D	560		100		83	
Bromodichloromethane	--	--	ND	U	ND	U	< 3	U	< 50	U	< 1	U	ND	
2 - Butanone	--	--	ND	U	ND	U	< 5	U	< 50	U	< 10	U	ND	
tert-Butylmethyl ether	--	--	ND	U	350		NA		100		25		419	
Carbon disulfide	--	--	ND	U	ND	U	ND	U	ND	U	1.6		1.9	J
Chloroform	100	--	ND	U	ND	U	< 3	U	< 50	U	1.1		0.6	J
cis-1,2-dichloroethene	--	70	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,1-dichloroethene	5	7	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,2-dichloroethane	10	5	ND	U	ND	U	< 3	U	< 50	U	3.4		ND	
Ethylbenzene	750	700	ND	U	ND	U	870	D	19	J	140		6.8	
Methylene chloride	100	--	ND	U	ND	U	< 3	U	< 50	U	< 2	U	ND	
Tetrachloroethene	20	5	ND	U	ND	U	ND	U	ND	U	< 1	U	ND	
1,1,1-Trichloroethane	60	200	ND	U	ND	U	< 3	U	< 50	U	< 1	U	ND	
Trichloroethylene	100	5	ND	U	ND	U	< 3	U	< 50	U	0.84	(J)	1.2	
Toluene	750	1,000	ND	U	ND	U	1	J	< 50	U	8.2		0.66	J
Styrene	--	100	ND	U	ND	U	1	J	< 50	U	< 1	U	ND	
o-Xylene	620 ³	10,000 ³	ND	U	ND	U	< 3	U	< 50	U	0.22	(J)	ND	
m,p-Xylenes	620 ³	10,000 ³	ND	U	ND	U	< 3	U	< 100	U	6.7		ND	
Freon 113													ND	

Table H7.3 (continued)
LTM Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Well Number	NMGWQ Standard (µg/L)	EPA MCL (µg/L)	S55-MW7												S55-MW6	
			Aug-95		Sep-97		Sep-99		Sep-01		Apr-03		Dec-05		Dec-05	
Sampling Date			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs (µg/L)																
Acetone	--	--	ND	U	ND	U	< 5	U	< 5	U	< 10	U				
Benzene	10	5	ND	U	ND	U	< 3	U	< 5	U	0.5	(J)				
Bromodichloromethane	--	--	ND	U	ND	U	< 3	U	< 5	U	< 1	U				
2 - Butanone	--	--	ND	U	ND	U	< 5	U	< 5	U	< 10	U				
tert-Butylmethyl ether	--	--	ND	U	ND	U	NA		3	J	280		161			
Carbon disulfide	--	--	ND	U	ND	U	ND	U	ND	U	< 1	U				
Chloroform	100	--	ND	U	ND	U	< 3	U	< 5	U	0.57	(J)	0.94	J	2	
cis-1,2-dichloroethene	--	70	ND	U	ND	U	ND	U	ND	U	< 1	U				
1,1-dichloroethene	5	7	ND	U	ND	U	ND	U	ND	U	< 1	U				
1,2-dichloroethane	10	5	ND	U	0.92	J	< 3	U	< 5	U	1.9		1.1			
Ethylbenzene	750	700	ND	U	ND	U	< 3	U	< 5	U	< 1	U				
Methylene chloride	100	--	ND	U	ND	U	< 3	U	< 5	U	< 2	U				
Tetrachloroethene	20	5	ND	U	ND	U	ND	U	ND	U	< 1	U				
1,1,1-Trichloroethane	60	200	ND	U	ND	U	< 3	U	< 5	U	< 1	U				
Trichloroethylene	100	5	6.7		6.7		< 3	U	< 5	U	0.38	(J)			9	
Toluene	750	1,000	ND	U	ND	U	< 3	U	< 5	U	< 1	U				
Styrene	--	100	ND	U	ND	U	< 3	U	< 5	U	< 1	U				
o-Xylene	620 ³	10,000 ³	ND	U	ND	U	< 3	U	< 5	U	< 1	U				
m,p-Xylenes	620 ³	10,000 ³	ND	U	ND	U	< 3	U	< 10	U	< 2	U				
Freon 113																

Table H7.3 (continued)
LTM Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Notes:

¹Unless otherwise reported, no VOCs were detected using EPA Method 8260B.
(EPA Method 8260A was used analyze for VOCs in the 1995 and 1997 program.)

²Upgradient monitoring well

³Total Xylene value presented as surrogate for o-Xylenes and m,p-Xylenes

CRDL = Contract Required Detection Limit

IDL = Instrument Detection Limit

ND = Not Detected at or above method reporting limit

NA = Not Analyzed

VOC = volatile organic compound

µg/L = micrograms per liter

EPA = United States Environmental Protection Agency

NMGWQ = New Mexico Groundwater Quality

MCL = Maximum Contaminant Level

U = non-detect analytical result

J = positive detection; reported value estimated

B = positive detection; reported value considered artifact of laboratory blank contamination

< = less than reported value

Laboratory Qualifiers-- assigned as a result of laboratory data assessment procedures

J - Estimated value; less than CRDL but greater than or equal to IDL

D - Value derived from analysis of diluted sample.

UB - Qualifies as non-detect due to presence of analyte in associated laboratory blank

EPA Qualifiers-- assigned as a result of independent data validation

(J)-- Estimated value based on QC criteria

(UJ)-- Estimated non-detect based on QC criteria

2003 Validation Qualifiers

J -- Estimated value detected less than the CRDL but greater than the reporting limit.

U -- The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection limit.

UJ -- Estimated as non-detect at the detection limit.

Results in **BOLD** and *italics* exceed NMGWQ Standards for Human Health and EPA Primary Drinking Water MCLs

Results in **BOLD** exceed NMGWQ Standards for Human Health

Results in *italics* exceed EPA Primary Drinking Water MCLs

Table H7.4
LTM TDS Groundwater Analytical Results
SS-48 (AOC N)
Holloman AFB, New Mexico

Well ID	Second Quarter (June) 2002 Lab TDS (mg/L)	Third Quarter (September) 2002 Lab TDS (mg/L)	Second Quarter (March) FY2003 Lab TDS (mg/L)	Dec 2005 LTM TDS (mg/L)
S55-MW-2	6,360	6,320	4,890	11,500
S55-MW-3	9,380	7,660	8,720	6,110
S55-MW-4	8,380	5,800	5,010	10,200
S55-MW-5	19,700	16,400	12,600	11,700
S55-MW-6	10,300	8,650	5,900	6,340
S55-MW-7	8,740	9,080	10,000	12,100

Notes:

TDS = total dissolved solids

mg/L = milligrams per liter

LTM = long term monitoring

Results in **BOLD** exceed the New Mexico TDS Standard of 10,000 mg/L.

FIGURES



File X:\AFC002\Holloman_AFB\TO37\Maps\
 SOB_7_Sites\SS-8_GW.mxd
 Project: TT3001.02.01
 Revised: 04/04/08 TB
 Map Source: Holloman AFB



Legend	
	Operable Unit Boundary (Approx.)
	Monitoring Well
	Groundwater Contour 2003 (ft MSL)
	Groundwater Flow Direction

Figure H7.1
SS-8 (AOC N)
Site Layout
Holloman AFB



BILL RICHARDSON
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
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RON CURRY
SECRETARY
CINDY PADILLA
SECRETARY

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

March 1, 2007

Debbie Hartell, Chief
Environmental Flight
49th CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

**RE: NOVEMBER 14, 2006 RESPONSE TO NMED COMMENTS ON THE FINAL
2005 LONG TERM GROUNDWATER MONITORING REPORT, MAY 2006
HOLLOMAN AIR FORCE BASE EPA ID# NM6572124422
HAFB-06-003**

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed Holloman AFB's (HAFB's) November 14, 2006 response to NMED's October 4, 2006 comments on the 2005 Long Term Monitoring Report (Report), dated May 2006. The remaining NMED comments that were required to be addressed in HAFB's response were Comment 4, regarding site OT-16, and Comment 11, regarding site SS-48. The response to comment number 11 is acceptable, as provided in the response.

The NMED is approving the Report with the following condition. HAFB's response to Comment 4 proposed ground water sampling and analysis for only gamma-BHC (Lindane) and Total Dissolved Solids (TDS) from all on-site monitoring wells for eight consecutive quarters. Because of past detections of other pesticides in the ground water at this site, the NMED requires that the ground water also be sampled and analyzed for alpha-BHC and dieldrin from all on-site monitoring wells for eight consecutive quarters.

Debbie Hartell
March 1, 2007
Page 2 of 2

If you have any questions regarding this letter, please contact Mr. David Strasser at (505) 222-9526.

Sincerely,

ORIGINAL SIGNED BY:

John E. Kicling
Program Manager
Permits Management Program
Hazardous Waste Bureau

JEK:dcs

cc: J. Bearzi, NMED IIWB
W. Moats, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HAFB
D. Tellez, EPA Region 6 (6PD-F)
File: HAFB 2007 and Reading
IIWB-IIAFB-06-003

Holloman AFB Fact Sheet/Statement of Basis

**Figure H7.2
NMED Approval Letter
March 1, 2007
Holloman AFB**

Filename: X:\AFC002\Holloman_AFB\TO37\Maps\
SOB_7_Sites\Letter2.cdr
Project: TT3001.02.01
Revised: 04/04/08 TH

