File: 12-1-2003

ENVIRONMENTAL RESTORATION PROGRAM

MANAGEMENT ACTION PLAN

Holloman Air Force Base, New Mexico

December 2003

Management Action Plan

Public Version

Holloman Air Force Base
New Mexico
December 2003

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Executive Summary

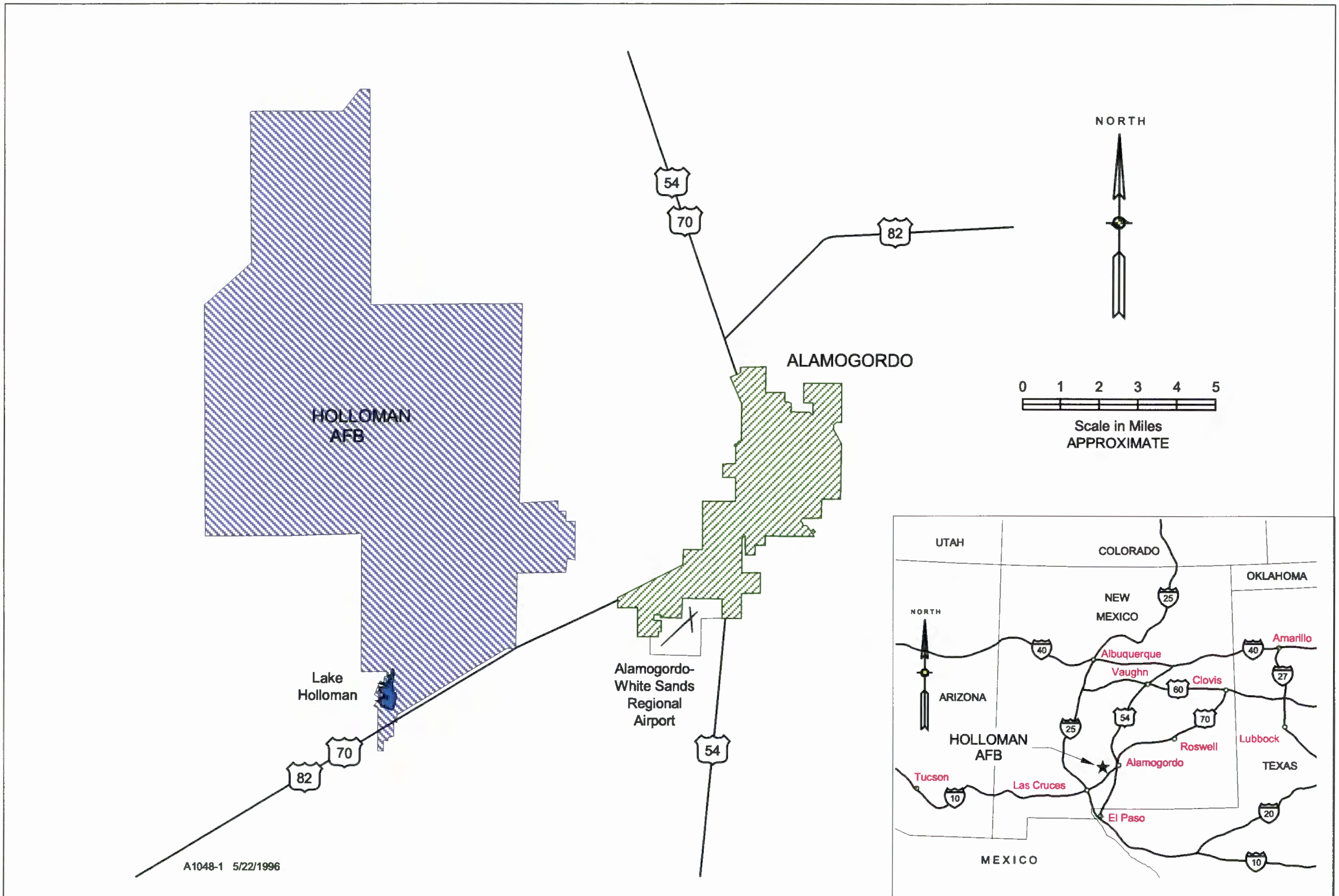
This Management Action Plan (MAP) describes the integrated, coordinated approach of conducting the environmental restoration program (ERP) activities required at Holloman Air Force Base. A general overview of the installation and restoration sites is provided to assist in communicating with state and federal regulators and the public to develop a comprehensive and meaningful plan useful to all.

This MAP summarizes the status of the Holloman Air Force Base ERP and identifies specific program issues to promote effective investigation and cleanup strategies. The focus of the MAP is to get cleanup remedies in place (RIP) and to attain response complete (RC) as early as possible. Meeting RIP/RC schedules will ensure a corresponding reduction in risk. Consequently, the MAP presents a comprehensive strategy for funding and implementing response actions necessary to protect human health and the environment.

Formal updates to this MAP use data from the Air Force Restoration Information Management System (AFRIMS). Information and estimates provided on costs, schedules, relative risk, and remedial activities, do not necessarily represent those that have been, or will be approved, by the Air Force, state or federal regulatory agencies. The cost estimates are made based on best available information at this time, and may dramatically vary over time.

Holloman Air Force Base is in the process of planning and executing environmental response actions to address contamination resulting from past installation operations. Environmental response actions are planned and executed under the ERP in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA) and other applicable laws. The ERP generally addresses contamination due to releases of hazardous substances or petroleum products that occurred prior to January 1984.

The data in this MAP is taken from the AFRIMS database as of Monday, December 01, 2003



Holloman Air Force Base New Mexico	HOLLOMAN LOCATION MAP	Figure 1-1

Installation Summary

Holloman Air Force Base
49th Figher Wing 490 First
St., Ste 1700 Holloman
AFB NM 88330-8277
Alamogordo, NM 88330-8458

Holloman Air Force Base is located in EPA Region 06. The Installation Federal Facility ID is NM657212442200.

Number of sites:	64 Sites & 1 AOCs
Prior year funding (FY03):	$3,551,652
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$1,891,655

Milestones for program completion.

All Sites/AOCs have achieved:	Remedy in Place (RIP)	12/30/2006
	Response Complete (RC):	12/22/2028
	Site Complete (SC)	9/30/2029

Installation History:

As a result of past waste and resource management practices at Holloman Air Force Base, some areas have become contaminated by various toxic and/or hazardous compounds. In response, an environmental clean-up program (which is referred to within the Air Force as the Environmental Restoration Program (ERP)) has been initiated at the Base. In addition, ongoing efforts to comply with applicable laws and regulations ensure that
present waste and resource mana gement practices are carried out in a manner that protects human health and the environment.

History of environmental restoration efforts at the installation:

The ERP at Holloman AFB began on May 1983 with a base-wide Records Search that identified 43 ERP sites for further investigation. Supplemental investigations in the late 1980s and early 1990s have brought the total number of ERP sites to 64. Eight Areas of Concern (AOCs) and 106 Solid Waste Management Units (SWMU) have been identified and are listed in the RCRA Part B Permit issued by the New Mexico Environmental Department (NMED). Most of the SMWUs and AOCs are ERP sites, and are therefore being investigated and cleaned up under the ERP (some ERP sites are composed of one or more SWMUs or AOCs).

Types of operations at the installation:

Holloman AFB, formerly Alamogordo Army Airfield, was initiated as a temporary facility during World War II, with construction commencing on 6 February 1942. Its status, mission, and Command have periodically changed over the years. Today, Holloman is under the Air Combat Command (ACC). The history of Base operations is summarized below: Pre-1942 Rangeland
1942-1945 Alamogordo Army Airfield
Hazardous Substance Activities - Unknown
1945-1947 Inactive
1947-1951 Air Material Command
Hazardous Substance Activities - Testing pilotless aircraft, guided missiles, and allied equipment Petroleum, oil, and lubricants (POL), solvents, and protective coatings
1951-1952 Air Force Missile Test Center
Hazardous Substance Activities - Testing pilotless aircraft, guided missiles, and allied equipment POL, solvents, and protective coatings
1952-1957 Holloman Air Development Center

Hazardous Substance Activities - Testing pilotless aircraft, guided missiles, and allied equipment POL, solvents, and protective coatings
1957-1971 Air Force Missile Development Center
Hazardous Substance Activities - Testing pilotless aircraft, guided missiles, and allied equipment POL, solvents, and protective coatings
1971-1992 Tactical Air Command
Hazardous Substance Activities - 49th Tactical Fighter Wing, 479th Tactical Training Wing, 833rd Air Division, and 4449th Mobile Support Squadron POL, solvents, protective coatings, and radionuclides
1992-Present Air Combat Command
Hazardous Substance Activities - 49th Tactical Fighter Wing, POL, solvents, protective coatings, and radionuclides

General environmental setting at the installation:

Holloman AFB is located in south-central New Mexico, about 75 miles north- northwest of El Paso, Texas. The Base covers approximately 59,827 acres. Highway 70, which runs in a southwesterly-northeasterly direction, provides most of the southern boundary; the other sides of the Base are bordered by open land (see Figure 1-2). The Base is located in the Tularosa Basin, which is bounded by the San Andres Mountains to the west and the Sacramento Mountains to the east. The Basin's interior plain has low relief, with altitudes ranging from approximately 4,000 feet in the southwest to approximately 4,400 feet in the northeast. The surrounding mountains rise to altitudes of 7,000 to 12,000 feet. The climate in the Tularosa Basin is arid, with low annual rainfall and low relative humidity. Mean annual precipitation is 7.9 inches, mostly from thunderstorm activity from May through October. The mean annual lake evaporation rate is approximately 67 inches.

Technical Issues Information at the installation:

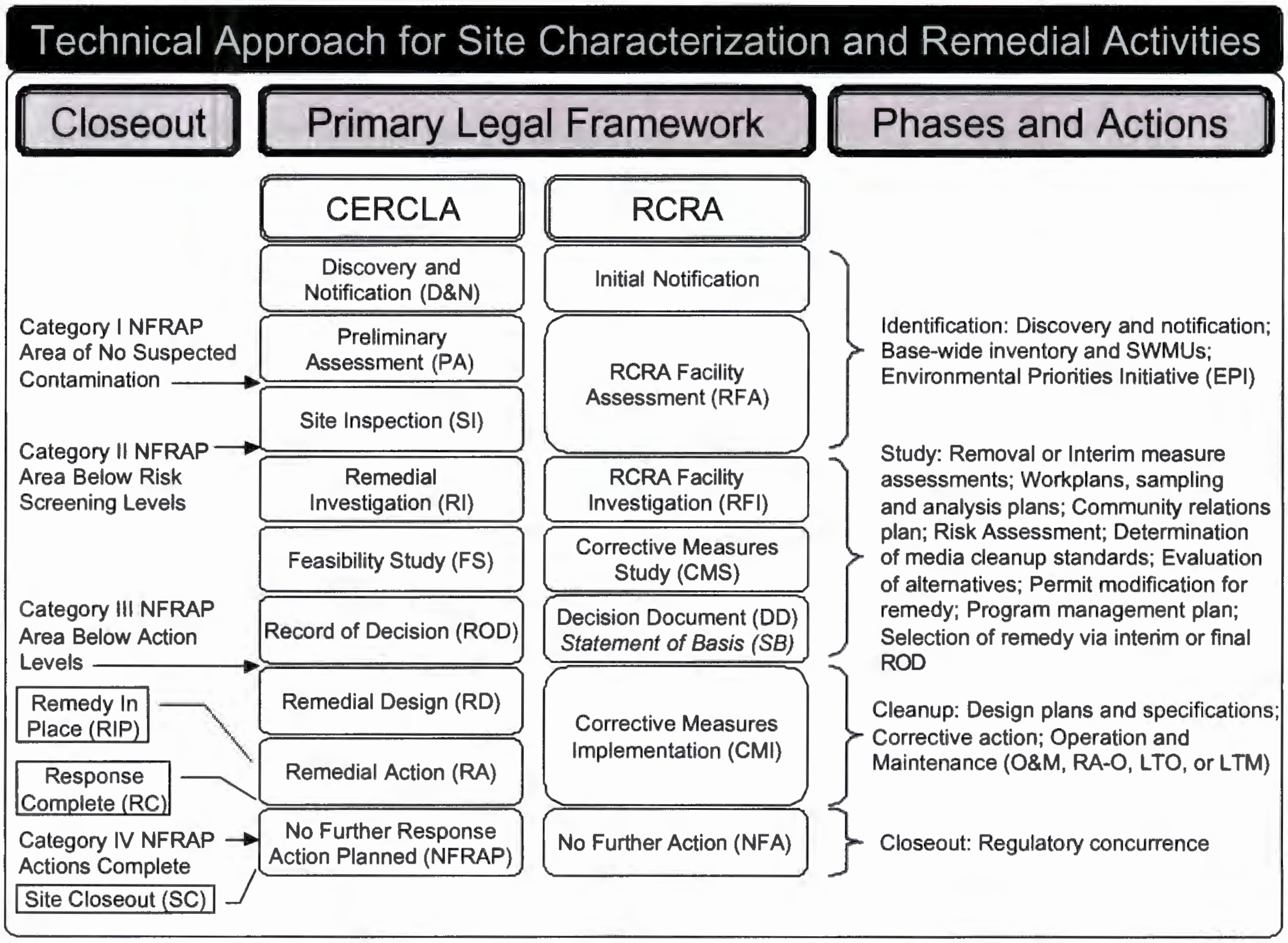
None

An outline of the technical approach

The technical approach taken at each ERP site has the following goals:

1) Pursue remedial action strategies that are cost-effective while being fully protective of human health and the environment.
2) Offer open and sustained input into remediation decisions for all stakeholders.
3) Use partnerships and consensus building with regulatory agencies to define and execute cleanup requirements.
4) Contain and clean up sites that are above maximum contaminant levels or other risk-based levels; treat contaminants and clean up to background levels if technically and economically feasible.

The Air Force is committed to developing cleanup strategies that support Department of Defense (DoD) policy to reduce relative risk, prevent future contamination, achieve compliance, develop partnerships, involve stakeholders, evaluate cost and performance, comply with legal agreements, and consider future land use. The figure below identifies the major steps and actions that guide the ERP process at each site.



List of current year projects:

Project List

FY	CMD	INST	REQ NO	Description	Service	Phase	Risk	Legal	Pri	Agent
2004	ACC	HOL	KWRD20047009	LTM MULTI-SITES	AF	LTM	NR	C	5B	COE
2004	ACC	HOL	KWRD20047018	RA-O MULTI -SITE	AF	RA-O	NR	C	5A	COE
2004	ACC	HOL	KWRD20047050	TDY	AF	MGT	NR	Z	0M	MAJ
2004	ACC	HOL	KWRD20047050A	Admin/RAB	AF	RAB	NR	Z	0M	MAJ
2004	ACC	HOL	KWRD20047052	MPR	AF	MPR	NR	Z	0M	MAJ
2004	ACC	HOL	KWRD20047064	IRA-C DP-64 Chemical Agent Site	AF	IRA-C	H	C	1A	COE

RAB information:

A Restoration Advisory Board (RAB) was formed on Sep 1, 1994.

RAB Members:

Installation residents
Local residents/community members

RAB Advice:

Relative risk evaluation
Remedy selection
Scope of studies
Study or cleanup schedule

RAB Activities:

Established operting procedures
Improved installation credibility
Participated in or reviewed site relative risk evaluations
Provided comments or advice
Received training
Reviewed plans and technical documents

Justification for funding sites

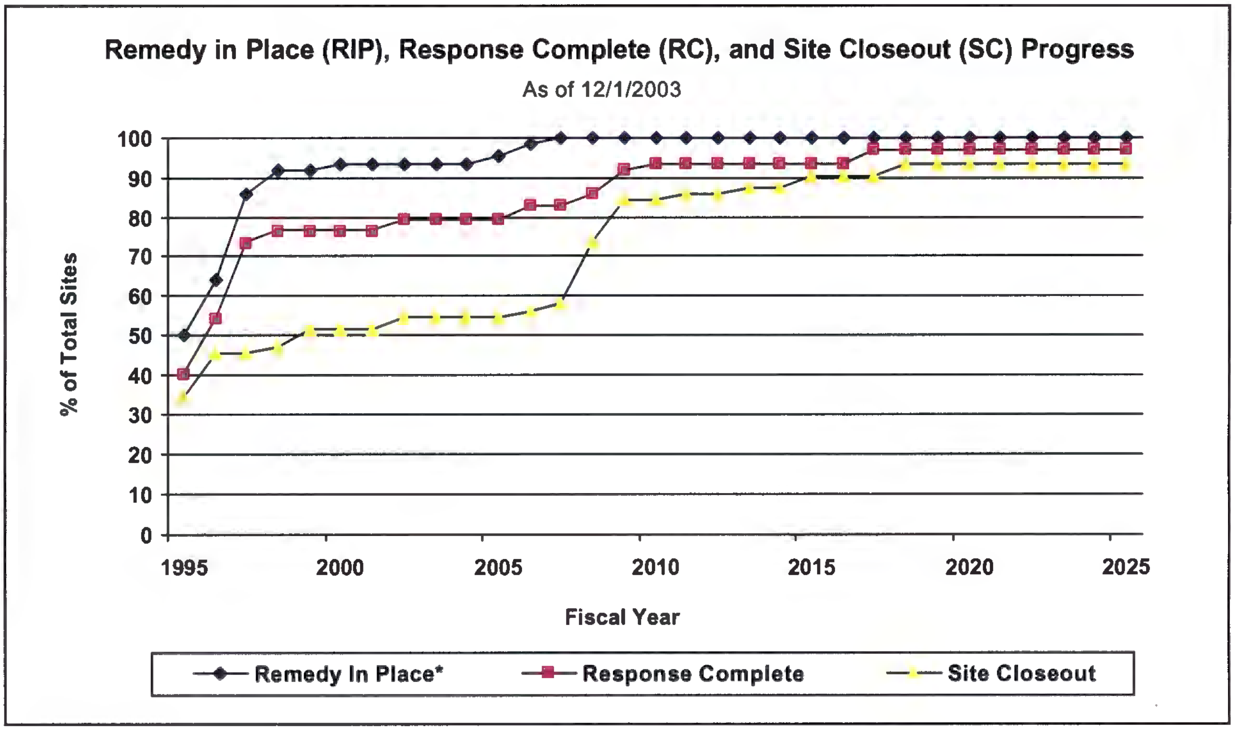
The primary focus of the Holloman Air Force Base ERP is protection of human health and the environment. This focus lead the Department of Defense to create goals, which focus restoration efforts on the 'worst' sites first. Priorities are established using a relative risk ranking system. However, a relative risk ranking is not required for sites with a remedial action in place so that operations and maintenance for these sites will be funded even though the relative risk is not 'High'. Parties with an active interest in the Holloman Air Force Base ERP have been made aware of funding priorities and the approximate range of costs associated with these cleanup activities and have generally agreed with the funding priorities.

Funding at each site is established using a 'risk plus other factors' priority ranking which includes the following evaluations:

a) cultural, social, and economic factors, including environmental justice considerations;
b) potential or future use of the facility, its effect on the local communities' economy, vitality, livability, and environmental quality;
c) the ecological impacts of the contamination and the proposed action to address it (in those instances where protection of the environment is not used as a primary basis for establishing cleanup funding priorities);
d) intrinsic and future value of affected resources (e.g., groundwater and fisheries);
e) pragmatic considerations such as availability and continuity of skilled workers, labs, cleanup contractors to complete the activity or the feasibility of carrying out the activity in relation to other activities at the facility (i.e., capacity and work flow logic), or both;
f) the overall cost and cost effectiveness of a proposed activity and especially the relative risk reduction value obtained by the proposed expenditure;
g) making land available for other uses, recognizing that land uses may change over time;
h) the importance of reducing infrastructure costs (e.g., $300 million is spent each year to monitor tanks at Hanford and $130 million is spent each year at Rocky Flats to safeguard special nuclear material);
i) the availability of new or innovative technologies that might accelerate or improve the ability to achieve a permanent remedy;
j) Native American treaties, statutory rights (e.g., American Indian Religious Freedom Act), and trust responsibilities;
k) regulatory requirements and the acceptability of the proposed action to regulators and other stakeholders;
l) supporting accomplishment of other high priority agency objectives;
m) life-cycle costs; and
n) actual and anticipated funding levels (the congressional budget appropriation, OMB apportionment,

allotments of funds to agencies or departments and the facilities, and out year funding targets).

RIP, RC and SC Progress:

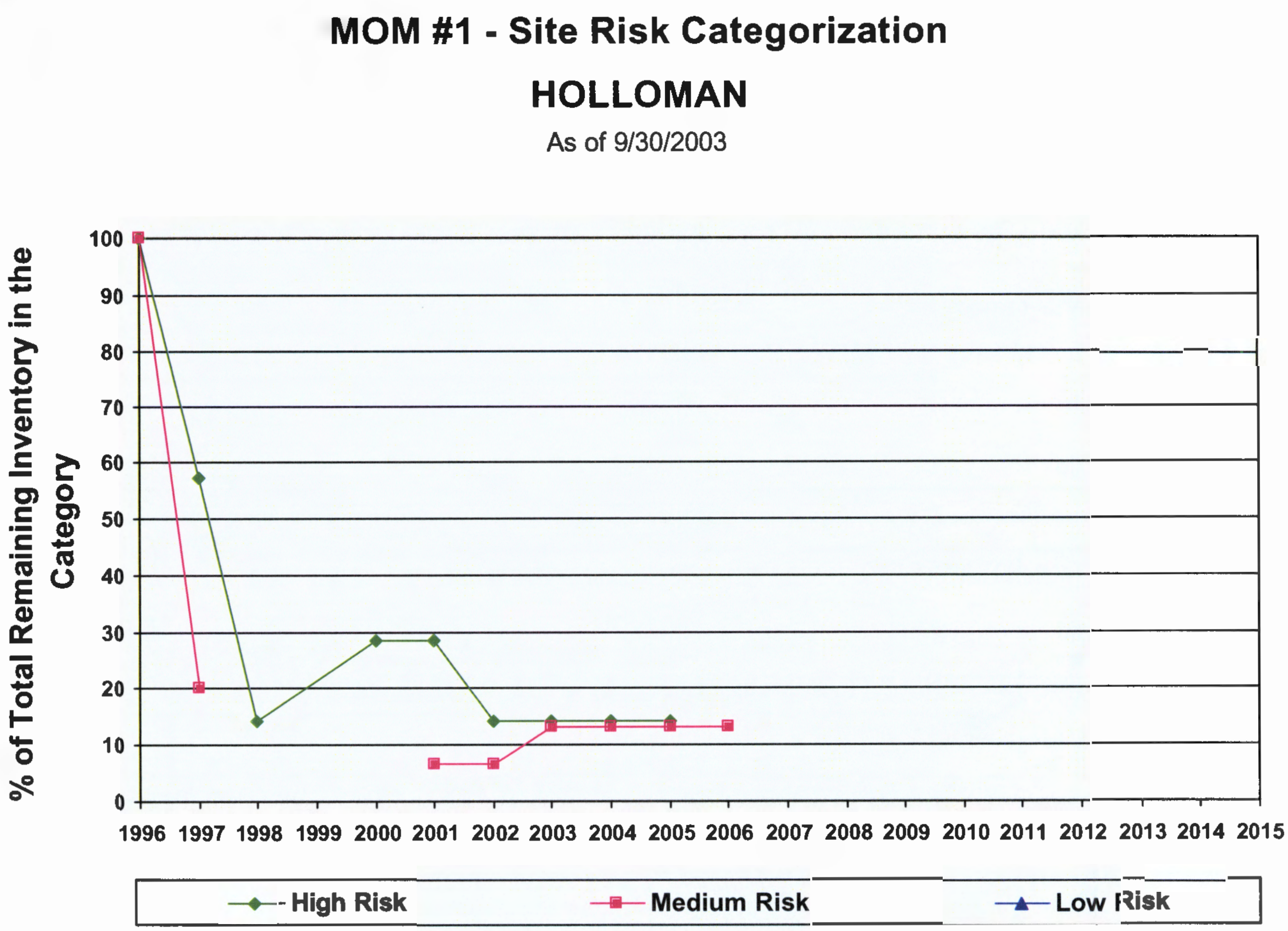


Site Summaries

AIR FORCE INSTALLATION RESTORATION PROGRAM
WORK IN PROGRESS - INVENTORY CONTROL MANAGEMENT
As of 9/30/2003

Site ID	Site/AOC	Relative Risk	RIP	RC	SC	IRA Status	ICM Category
LF001	Site	NR	11/03/1995	11/03/1995	09/30/2026		LTM
SS002	Site	NR	11/03/1995	11/01/2008	09/30/2009		RA-O
OT003	Site	NR	09/01/1995	11/03/1995	11/03/1995		NFRAP III
OT004	Site	NR	09/01/1995	11/03/1995	11/03/1995		NFRAP III
SS005	Site	NR	11/03/1995	11/01/2008	09/30/2009		RA-O
SS006	Site	NR	02/01/1987	09/30/1996	09/30/1996		NFRAP II
LF007	Site	NR	08/15/1991	08/15/1991	08/15/1991		NFRAP I
SD008	Site	NR	09/01/1996	12/22/2028	09/30/2029		RA-O
SS009	Site	NR	09/01/1994	09/15/1994	09/15/1994		NFRAP III
LF010	Site	NR	12/15/1996	12/15/1996	09/30/2008		LTM
OT011	Site	NR	09/01/1994	09/15/1994	09/15/1994		NFRAP III
SS012	Site	NR	11/03/1995	11/03/1995	11/03/1995		NFRAP III
SS013	Site	NR	01/01/1986	09/15/1991	09/15/1991		NFRAP II
OT014	Site	NR	04/04/1997	09/01/2028	09/30/2029		RA-O
SD015	Site	NR	09/01/1996	09/15/1996	09/15/1996		NFRAP II
OT016	Site	NR	09/01/1995	09/01/1995	09/30/2008		LTM
SS017	Site	NR	10/01/1996	12/01/2007	12/30/2008		RA-O
SS018	Site	NR	08/15/1991	08/15/1991	08/15/1991		NFRAP II
LF019	Site	NR	12/01/1996	12/01/1996	09/30/2008		LTM
OT020	Site	NR	11/03/1995	11/03/1995	11/03/1995		NFRAP III
LF021	Site	NR	12/01/1996	12/01/1996	09/30/2008		LTM
LF022	Site	NR	12/01/1996	12/01/1996	09/30/2008		LTM
LF023	Site	NR	09/26/1994	09/26/1994	09/01/2015		LTM
OT024	Site	NR	09/30/1996	09/30/1997	09/30/1999		NFRAP IV
SD025	Site	NR	08/01/1990	11/15/1990	11/15/1990		NFRAP III
SS026	Site	NR	09/01/1991	09/15/1994	09/15/1994		NFRAP III
SD027	Site	NR	05/20/1998	05/20/1998	09/30/1999		NFRAP II
SD028	Site	NR	09/01/1994	09/01/1994	09/01/1994		NFRAP III
LF029	Site	NR	12/01/1996	12/01/1996	12/01/2008		LTM
DP030	Site	NR	09/01/1995	09/01/1995	09/01/2008		LTM
FT031	Site	NR	01/01/1998	12/30/2007	12/30/2008		RA-O
OT032	Site	NR	10/01/1988	11/15/1990	11/15/1990		NFRAP II
SD033	Site	NR	10/01/1993	11/15/1995	09/01/2008		LTM
OT034	Site	NR	09/01/1984	08/15/1991	08/15/1991		NFRAP I
OT035	Site	NR	09/01/1992	11/01/1995	11/01/1995		NFRAP II
SS036	Site	NR	11/30/1996	11/30/1996	12/03/1997		NFRAP IV
OT037	Site	NR	08/01/1991	09/01/1994	09/01/1994		NFRAP III
OT038	Site	NR	09/01/1994	09/01/1994	09/01/1994		NFRAP III
SS039	Site	NR	12/01/1996	12/01/1996	09/01/2008		LTM
LF040	Site	NR	08/15/1991	08/15/1991	08/15/1991		NFRAP I
OT041	Site	NR	09/01/1994	09/01/1994	09/01/1994		NFRAP III
RW042	Site	NR	10/01/1993	10/01/1993	10/01/1993		NFRAP II
DP043	Site	NR	09/01/1994	09/01/1994	09/01/1994		NFRAP III
OT044	Site	NR	04/01/1997	04/01/1997	09/30/2008		LTM
OT045	Site	NR	03/01/1997	03/01/1997	12/30/1998		NFRAP IV
SS046	Site	NR	09/01/1995	09/01/1995	09/01/2015		LTM
SD047	Site	NR	11/01/1996	09/11/2002	09/11/2002		NFRAP IV
SS048	Site	NR	09/01/1995	12/30/2008	09/01/2009		RA-O
WP049	Site	NR	11/30/1999	09/01/2028	09/30/2029		RA-O
WP050	Site	NR	10/01/1988	09/15/1994	09/15/1994		NFRAP II
RW051	Site	NR	10/01/1988	09/15/1994	09/15/1994		NFRAP II
OT052	Site	NR	09/01/1984	08/15/1991	08/15/1991		NFRAP I
OT053	Site	NR	08/01/1991	09/15/1991	09/15/1991		NFRAP I
OT054	Site	NR	11/01/1984	08/15/1991	08/15/1991		NFRAP I
OT055	Site	NR	11/01/1984	08/15/1991	08/15/1991		NFRAP I
SS056	Site	NR	12/01/1996	12/01/1996	09/30/2008		LTM
SS057	Site	NR	11/30/1995	01/15/2009	12/30/2010		RA-O
LF058	Site	NR	09/30/1997	09/30/1997	09/01/2009		ROD/DD
SS059	Site	NR	01/01/1998	01/01/1998	09/01/2006		LTM
SS060	Site	NR	01/01/1998	09/11/2002	09/11/2002		NFRAP IV
SS061	Site	MED	09/30/2006	02/15/2017	09/30/2018		RI
DP062	Site	MED	01/19/2006	01/30/2006	10/30/2012		RI
DP063	Site	NR	12/30/2006	09/30/2017	09/30/2018		Awaiting Action - RD
DP064	Site	High	09/30/2005	09/30/2006	09/30/2007	Construction	Awaiting Action - RI
AOC-2	AOC	NE		09/15/2010			PA

Measure of Merit (MOM) #1 - Site Risk Categorization



LF001

Site Name: SITE 1 EXISTING MAIN BASE LNDFL
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF001
Relative Risk: NR

12/01/82 | 12/01/03 Today | 09/30/26

	Start Date	End Date
PA	12/01/82	08/01/83
SI	04/01/84	04/01/85
RI	01/01/88	06/01/89
FS		
ROD/DD	05/01/95	11/03/95
RD		
RA-AOC		
RA-O		
LTM	12/22/95	09/30/04

RIP 11/03/95
RC 11/03/95

SC 09/30/26

SS002

Site Name: SITE 2 POL AREA SPILL SITE #1
Current site phase status: RA-O
Relative Risk: NR
Prior year funding (FY03): $307,508
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $12,500

Site description:

SS-2 POL SPILL

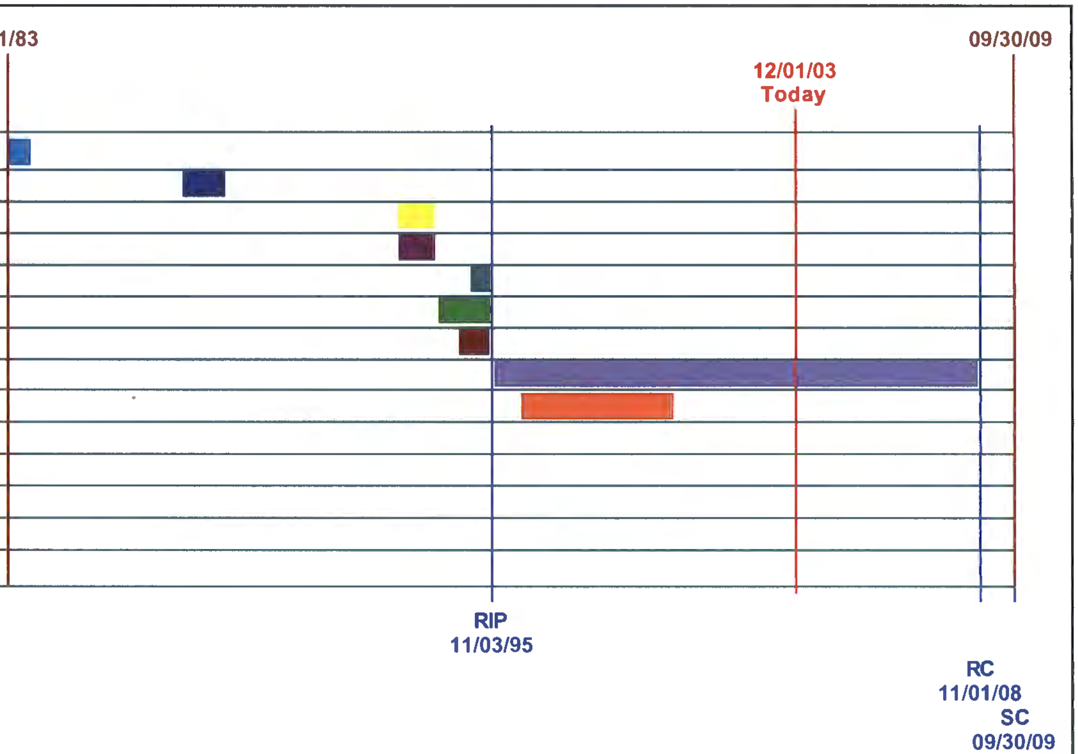
Remedy Type:

Remedy Type	Phase	Start Date	End Date
Bioventing	RA-C	01/10/95	09/30/95

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS002
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	06/01/93	05/01/94
FS	06/01/93	05/01/94
ROD/DD	05/01/95	11/03/95
RD	07/01/94	11/01/95
RA-C	01/10/95	09/30/95
RA-O	12/22/95	09/30/08
LTM	09/01/96	09/01/00



OT003

Site Name:	POL TANK SLUDGE BURIAL SITE
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

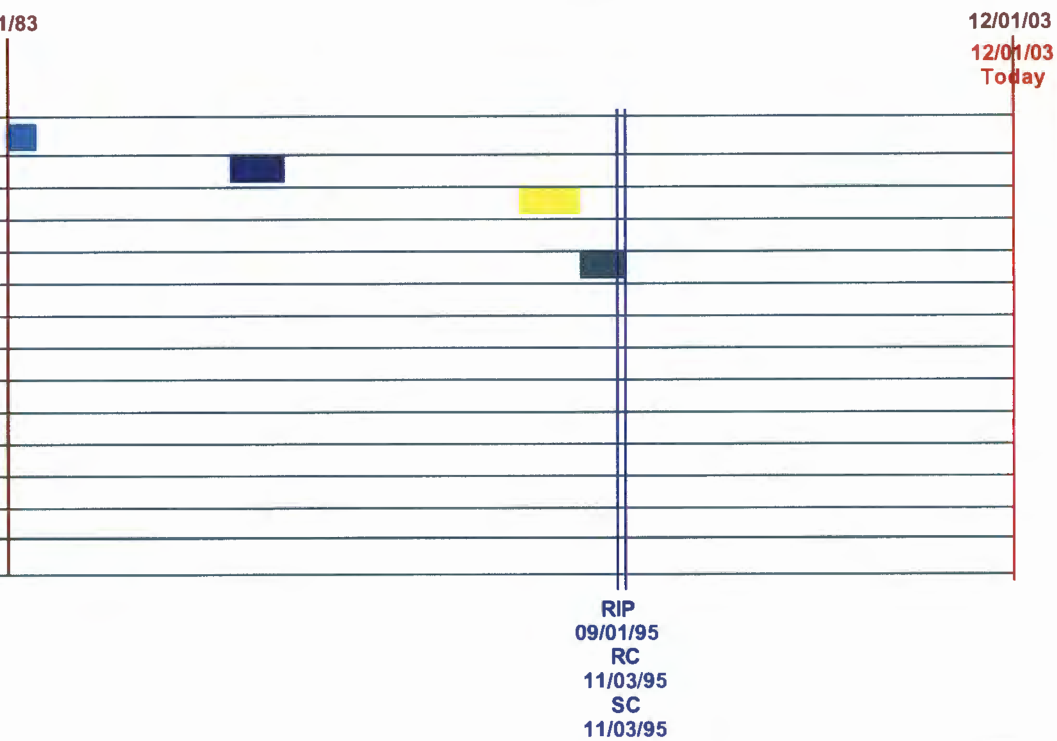
OT-03 POL TANK SLUDGE BURIAL SITE

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT003

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	09/01/93	12/01/94
FS		
ROD/DD	12/01/94	11/03/95
RD		
RA-C		
RA-O		
LTM		



OT004

Site Name: ACID TRAILER BURIAL STIE
Current site phase status: NFRAP III
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT004
Relative Risk: NR

01/01/83 12/01/03
12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	09/01/93	12/01/94
FS		
ROD/DD	12/01/94	11/03/95
RD		
RA-C		
RA-O		
LTM		

RIP
09/01/95
RC
11/03/95
SC
11/03/95

SS005

Site Name:	SITE 5 POL AREA SPILL SITE # 2	
Current site phase status:	RA-O	
Relative Risk:	NR	
Prior year funding (FY03):		$333,133
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$12,500

Site description:

SS-5 POL SPILL

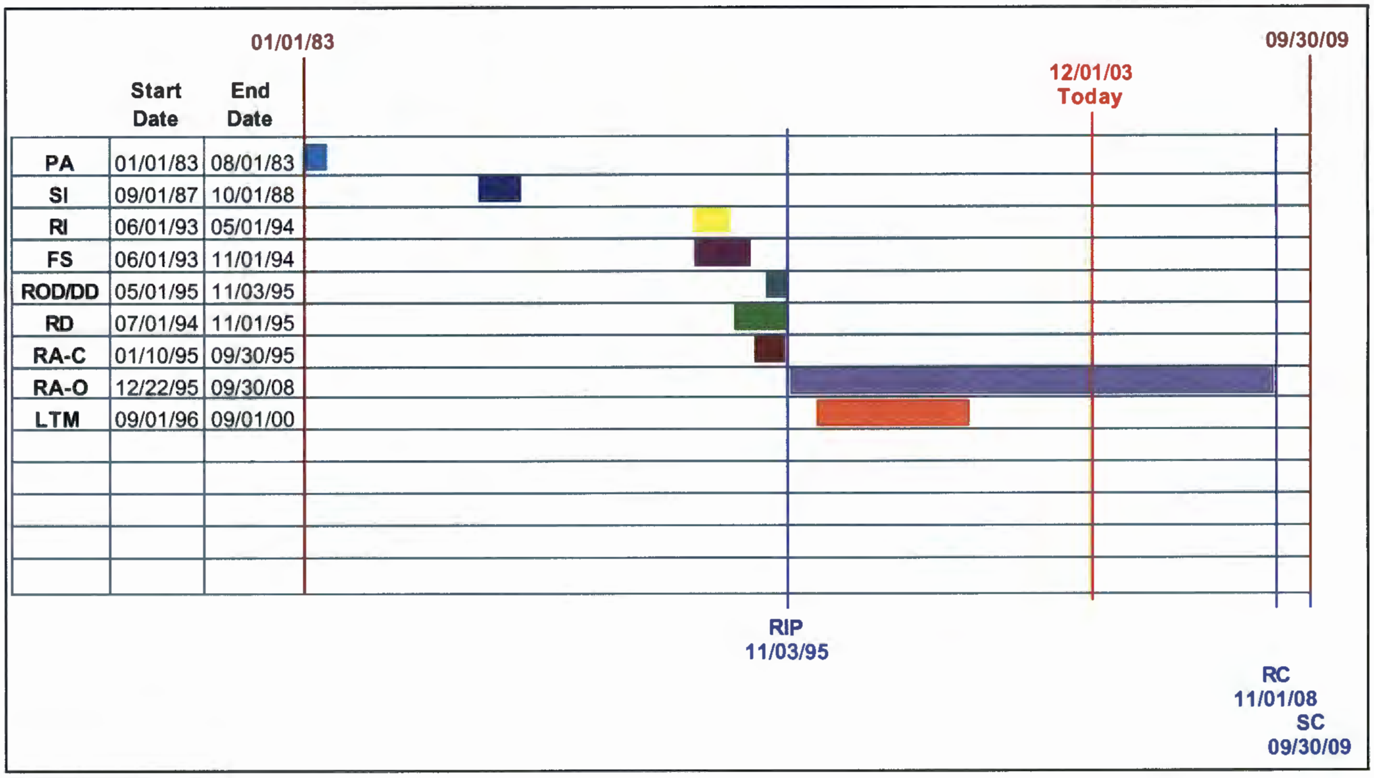
Remedy Type:

Remedy Type	Phase	Start Date	End Date
Bioventing	RA-C	01/10/95	09/30/95

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS005

Relative Risk: NR



SS006

Site Name: SITE 6 FUEL LINE SPILL SITE
Current site phase status: NFRAP II
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

SS-6 FUEL LINE SPILL

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS006

Relative Risk: NR

01/01/83 12/01/03

12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI	01/01/86	02/01/87
RI		
FS		
ROD/DD	06/30/96	09/30/96
RD		
RA-C		
RA-O		
LTM		

RIP 02/01/87

RC 09/30/96
SC 09/30/96

LF007

Site Name:	RUBBLE DISPOSAL SITE
Current site phase status:	NFRAP I
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF007

Relative Risk: NR

01/01/83 12/01/03

12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI		
FS		
ROD/DD	12/01/90	08/15/91
RD		
RA-C		
RA-O		
LTM		

RIP 08/15/91
RC 08/15/91
SC 08/15/91

SD008

Site Name: REFUSE COLLECT. TRUCK WASHRACK
Current site phase status: RA-O
Relative Risk: NR
Prior year funding (FY03): $25,626
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $139,200

Site description:

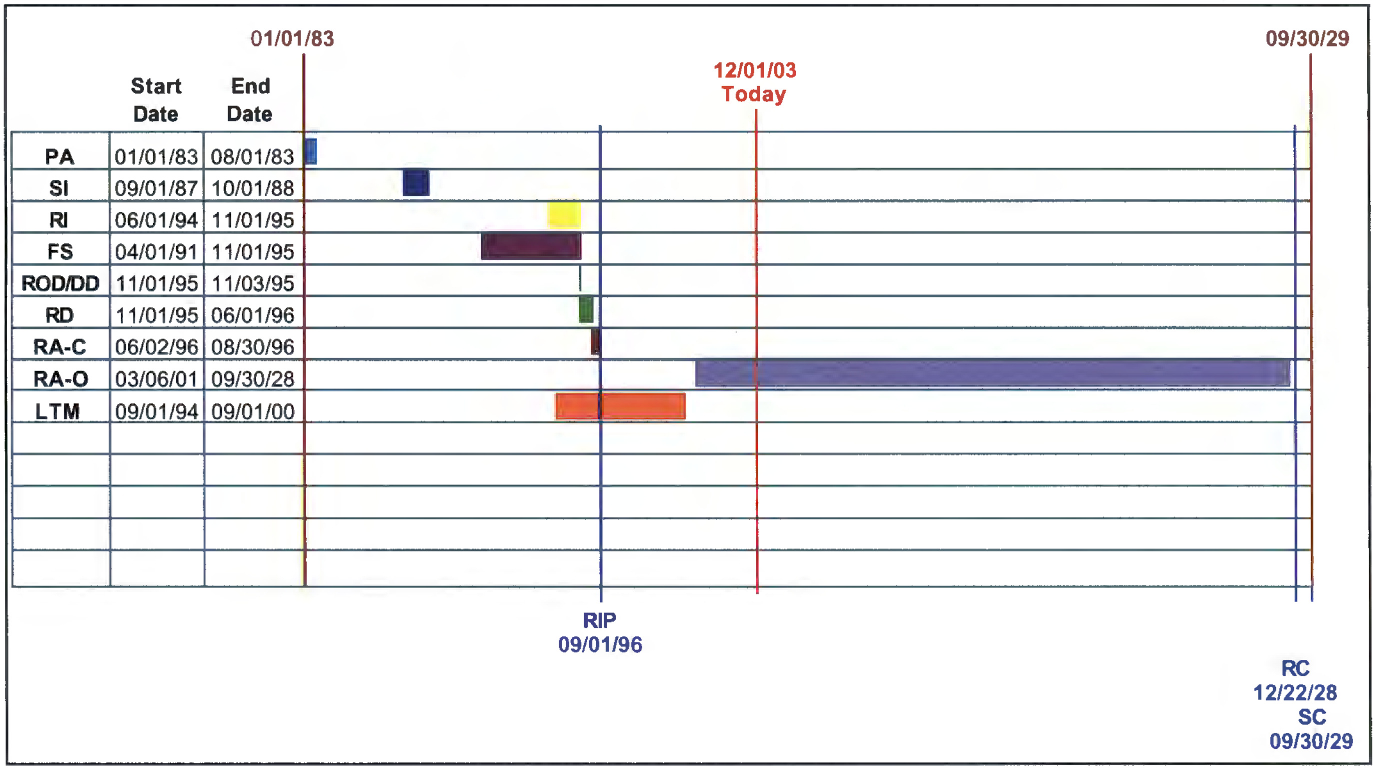
SD-8 REFUSE COLLECTION TRUCK WASHRACK

Remedy Type:

Remedy Type	Phase	Start Date	End Date
Capping	RA-C	06/02/96	08/30/96

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SD008
Relative Risk: NR



SS009

Site Name:	WASTE POL DRUM STORAGE/SP AREA
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

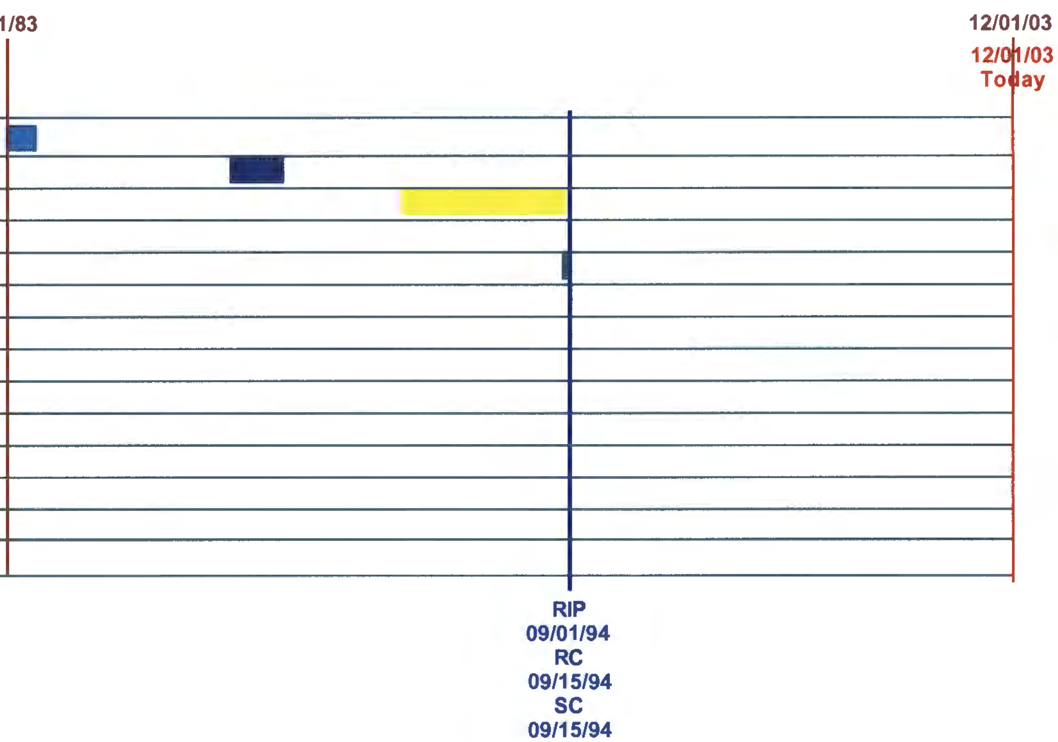
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS009

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	04/01/91	08/01/94
FS		
ROD/DD	08/01/94	09/15/94
RD		
RA-C		
RA-O		
LTM		



LF010

Site Name: SITE 10 OLD MAIN BASE LANDFILL
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

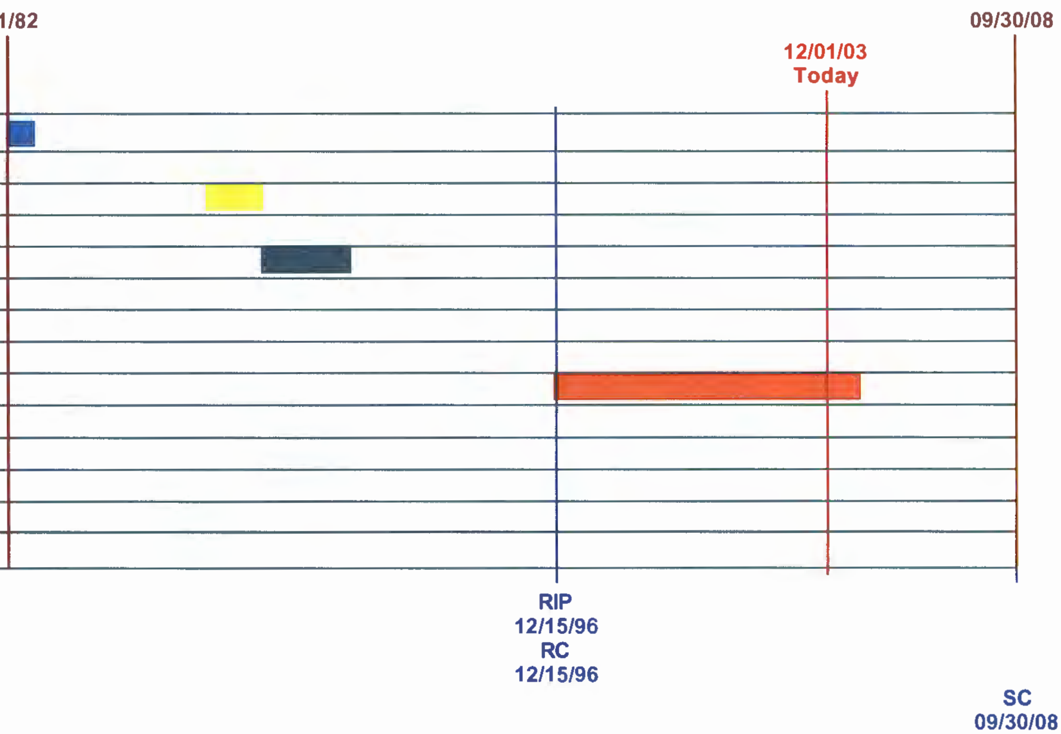
Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF010
Relative Risk: NR

	Start Date	End Date
PA	12/01/82	08/01/83
SI		
RI	01/01/88	06/01/89
FS		
ROD/DD	06/01/89	09/15/91
RD		
RA-C		
RA-O		
LTM	12/01/96	09/30/04



OT011

Site Name:	MAIN BASE ELECTRICAL SUBSTA.
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

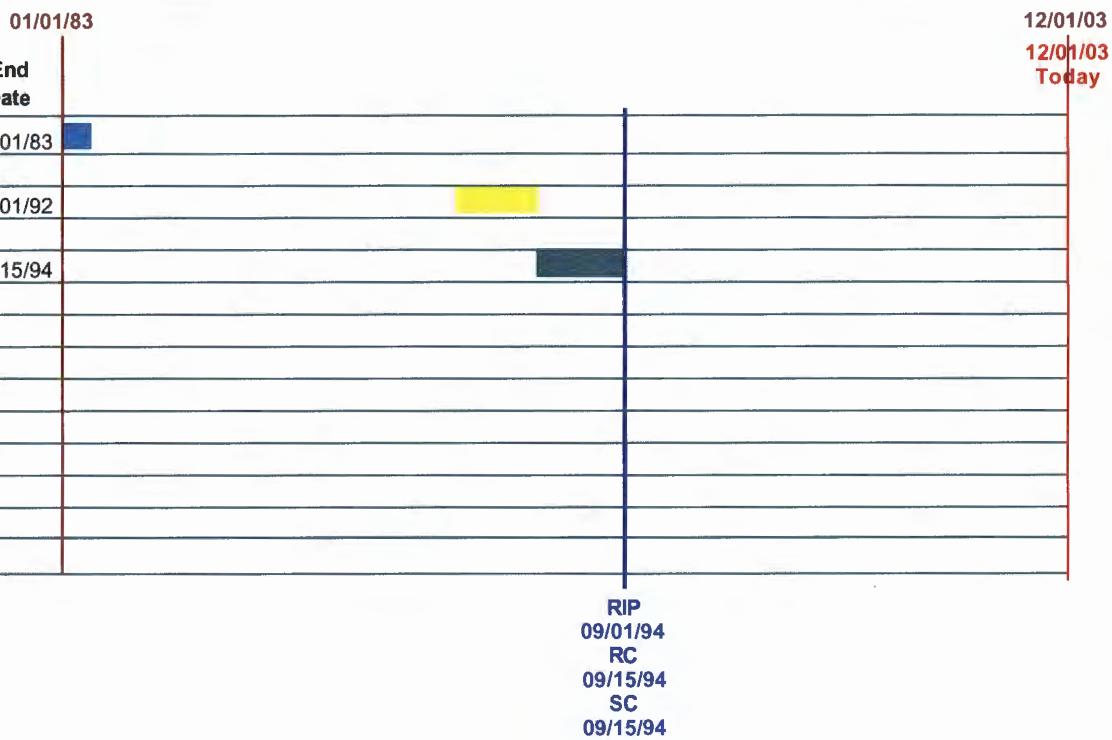
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT011

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	12/01/92
FS		
ROD/DD	12/01/92	09/15/94
RD		
RA-C		
RA-O		
LTM		



SS012

Site Name:	SITE 12 FUEL LINE SPILL
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

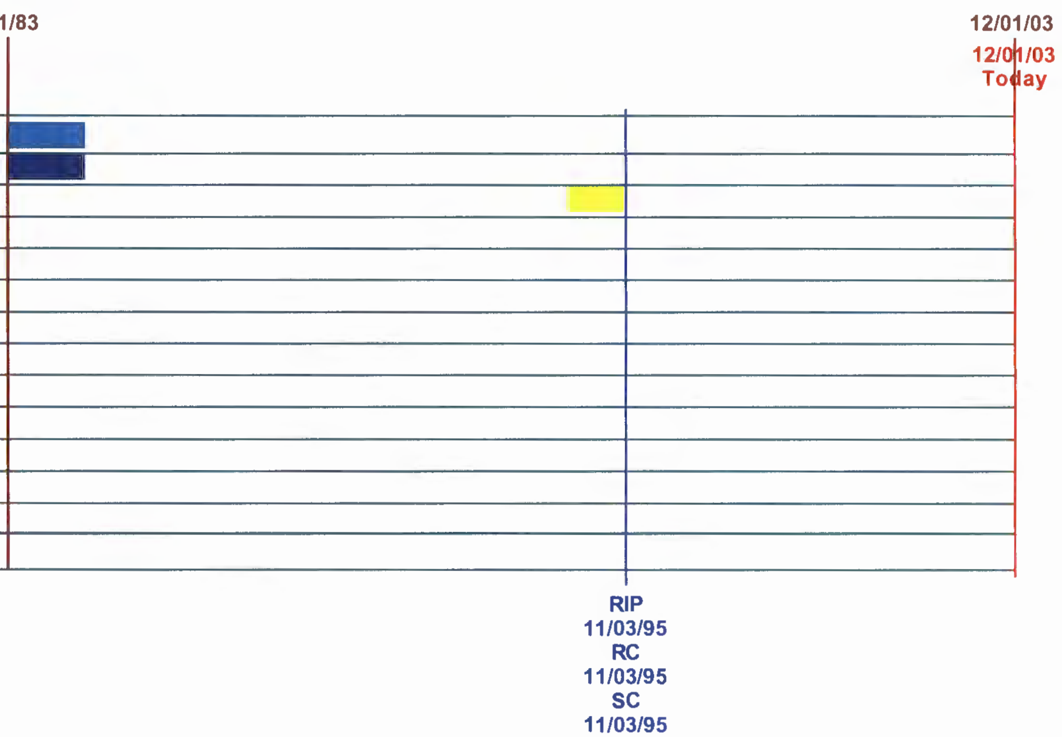
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS012

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/84
SI	01/01/83	08/01/84
RI	09/01/94	11/01/95
FS		
ROD/DD	11/01/95	11/03/95
RD		
RA-C		
RA-O		
LTM		



SS013

Site Name:	SODIUM ARSENITE SPILL SITE
Current site phase status:	NFRAP II
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS013

Relative Risk: NR

01/01/83 12/01/03

12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI	01/01/86	02/01/87
RI		
FS		
ROD/DD	01/30/90	09/15/91
RD		
RA-C		
RA-O		
LTM		

RIP 01/01/86

RC 09/15/91

SC 09/15/91

OT014

Site Name: FORMER ENTOMOLOGY SHOP AREA
Current site phase status: RA-O
Relative Risk: NR
Prior year funding (FY03): $25,626
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $139,200

Site description:

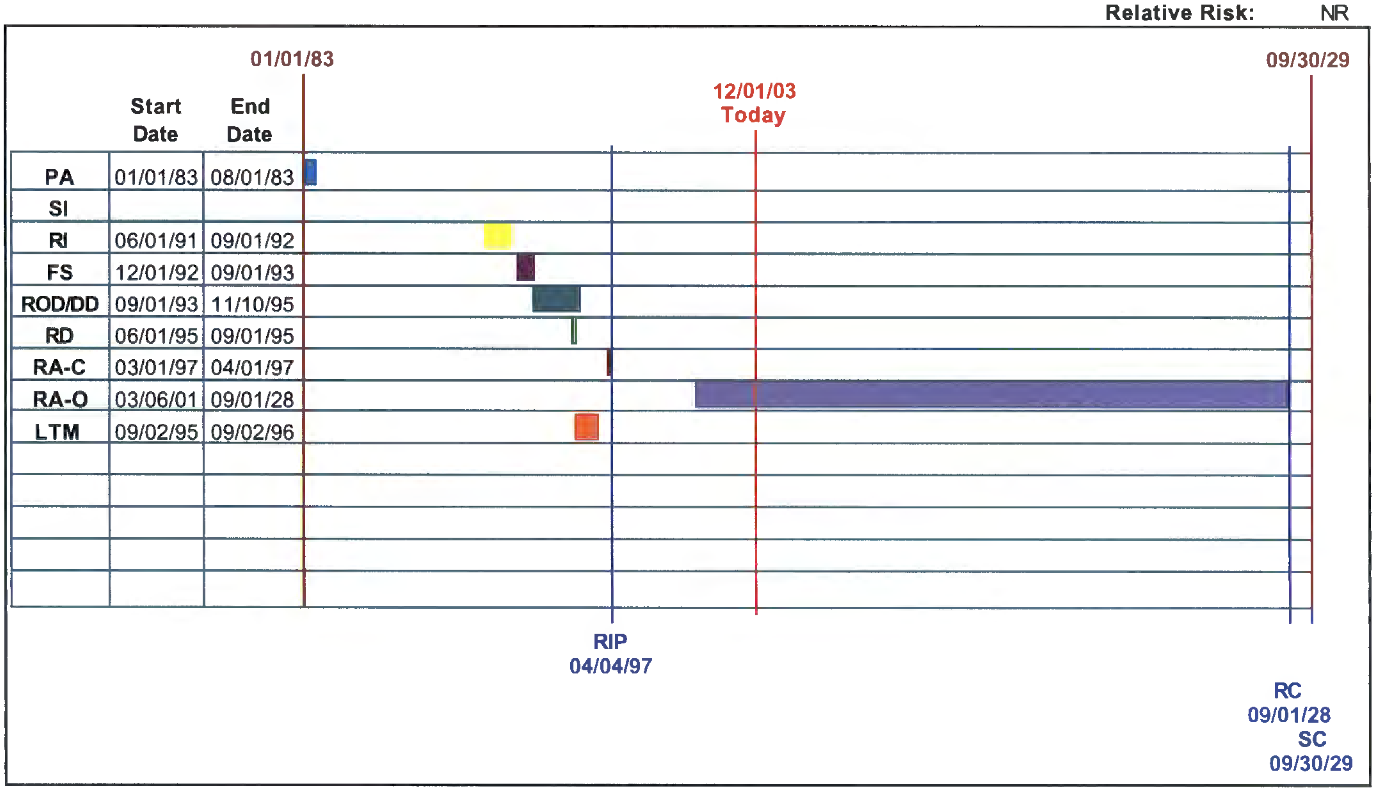
OT-14 FROMER ENTOMOLOGY SHOP

Remedy Type:

Remedy Type	Phase	Start Date	End Date
Capping	RA-C	03/01/97	04/01/97

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT014
Relative Risk: NR



SD015

Site Name:	REFRIG/HEAT SHOP WASHRACK
Current site phase status:	NFRAP II
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

REFRIG/HEAT SHOP

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SD015

Relative Risk: NR

01/01/83 12/01/03

12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI	06/01/94	09/01/95
RI		
FS		
ROD/DD	09/15/95	09/15/96
RD		
RA-C		
RA-O		
LTM		

RIP
09/01/96
RC
09/15/96
SC
09/15/96

OT016

Site Name:	EXISTING ENTOMOLOGY SHOP AREA
Current site phase status:	LTM
Relative Risk:	NR
Prior year funding (FY03):	$14,344
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$22,300

Site description:

OT-16 ENTOMOLOGY SHOP

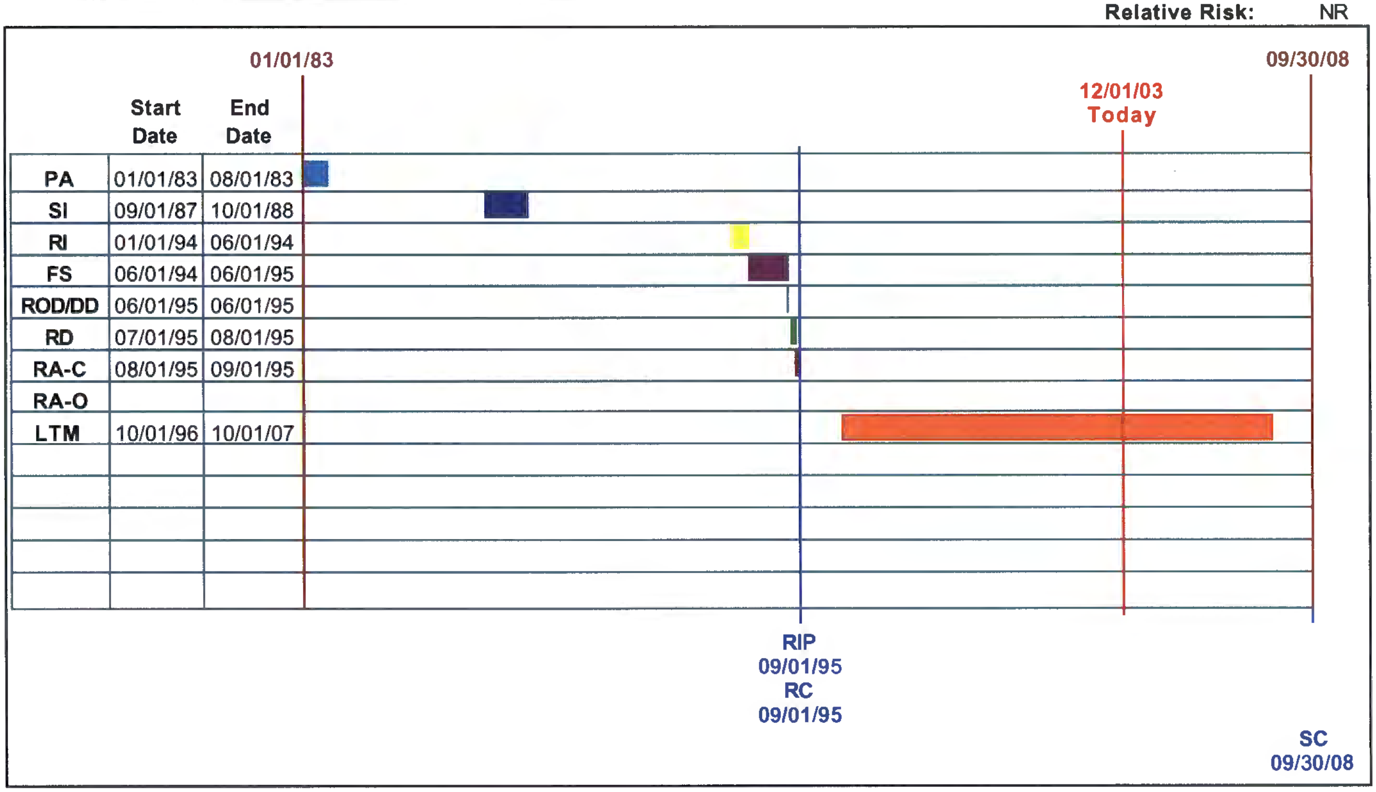
Remedy Type:

Remedy Type	Phase	Start Date	End Date
Removal	RA-C	08/01/95	09/01/95

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT016

Relative Risk: NR



	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	01/01/94	06/01/94
FS	06/01/94	06/01/95
ROD/DD	06/01/95	06/01/95
RD	07/01/95	08/01/95
RA-C	08/01/95	09/01/95
RA-O		
LTM	10/01/96	10/01/07

SS017

Site Name:	SITE 17 BX STATION FUEL LEAK
Current site phase status:	RA-O
Relative Risk:	NR
Prior year funding (FY03):	$691,893
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$25,000

Site description:

SS-17 BX SERVICE STATION

Remedy Type:

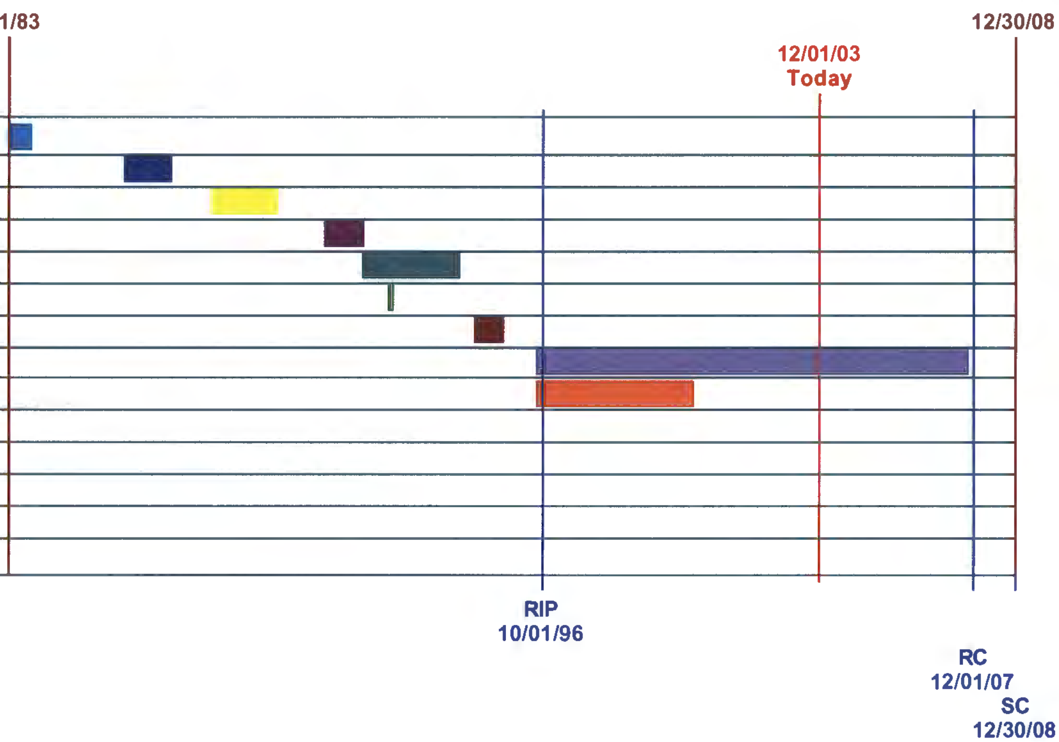
Remedy Type	Phase	Start Date	End Date
Bioventing	RA-C	01/10/95	09/30/95

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS017

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	01/01/86	03/01/87
RI	04/01/88	12/01/89
FS	03/01/91	03/01/92
ROD/DD	03/01/92	08/15/94
RD	11/01/92	12/01/92
RA-C	01/10/95	09/30/95
RA-O	09/01/96	09/30/07
LTM	09/01/96	09/01/00



SS018

Site Name:	SITE 18 CHRONIC ACID SP SITE
Current site phase status:	NFRAP II
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

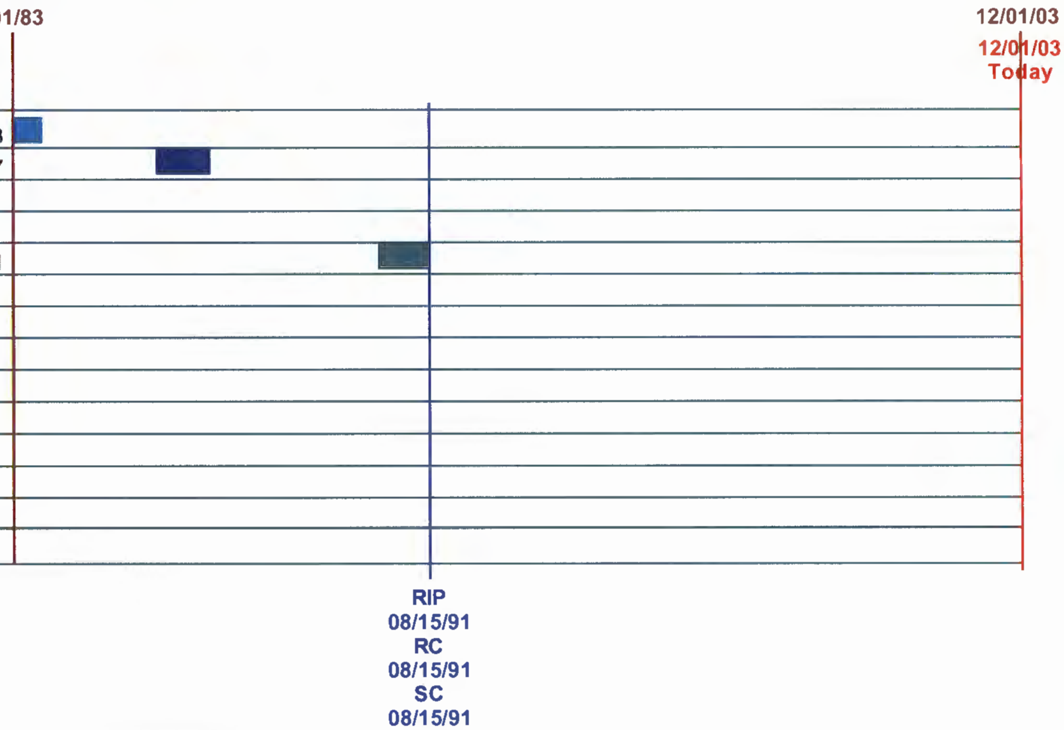
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS018

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	01/01/86	02/01/87
RI		
FS		
ROD/DD	08/15/90	08/15/91
RD		
RA-C		
RA-O		
LTM		



LF019

Site Name:	SITE 19 GOLF COURSE LANDFILL
Current site phase status:	LTM
Relative Risk:	NR
Prior year funding (FY03):	$14,344
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

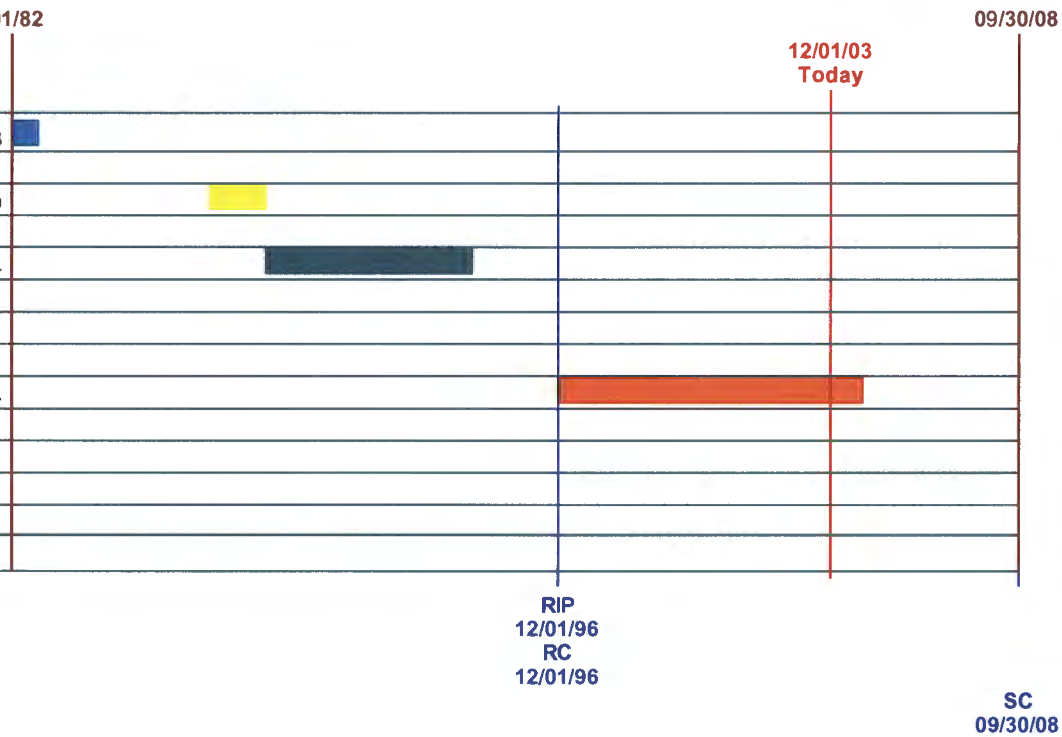
SITE 19 GOLF COU

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF019

Relative Risk: NR

	Start Date	End Date
PA	12/01/82	08/01/83
SI		
RI	01/01/88	06/01/89
FS		
ROD/DD	06/01/89	09/15/94
RD		
RA-C		
RA-O		
LTM	12/01/96	09/30/04



OT020

Site Name: SITE 20 STP GRIT BURIAL
Current site phase status: NFRAP III
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

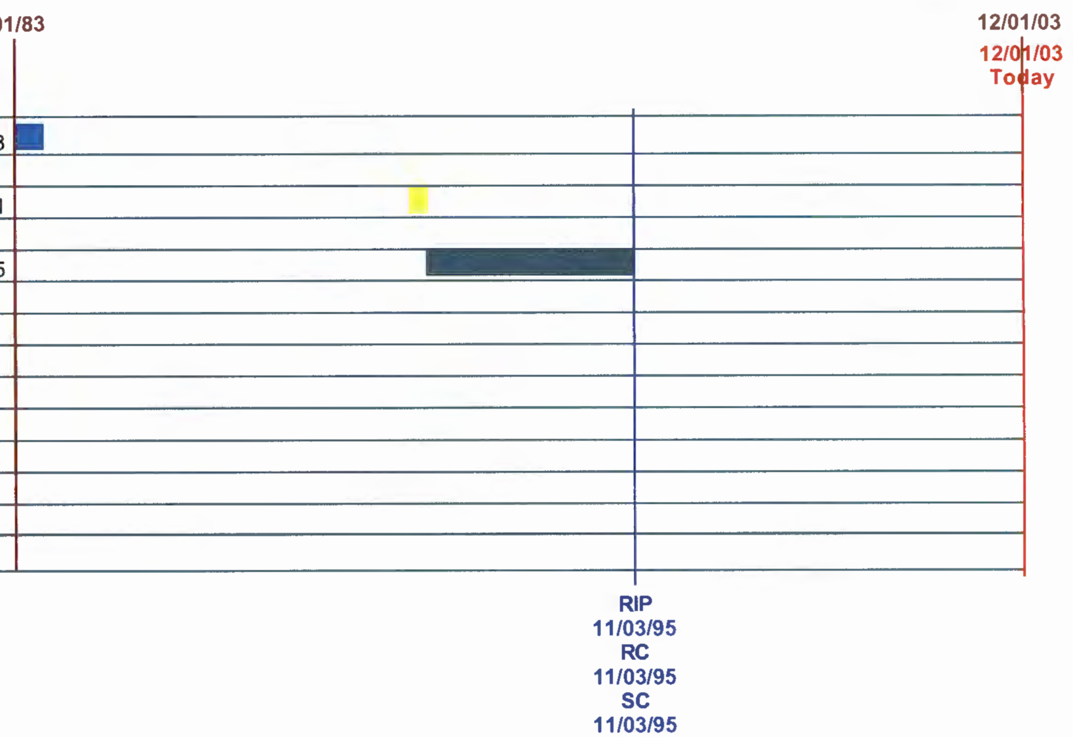
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT020

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	11/03/95
RD		
RA-C		
RA-O		
LTM		



LF021

Site Name: SITE 21 WEST AREA LANDFILL #2
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $10,245
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

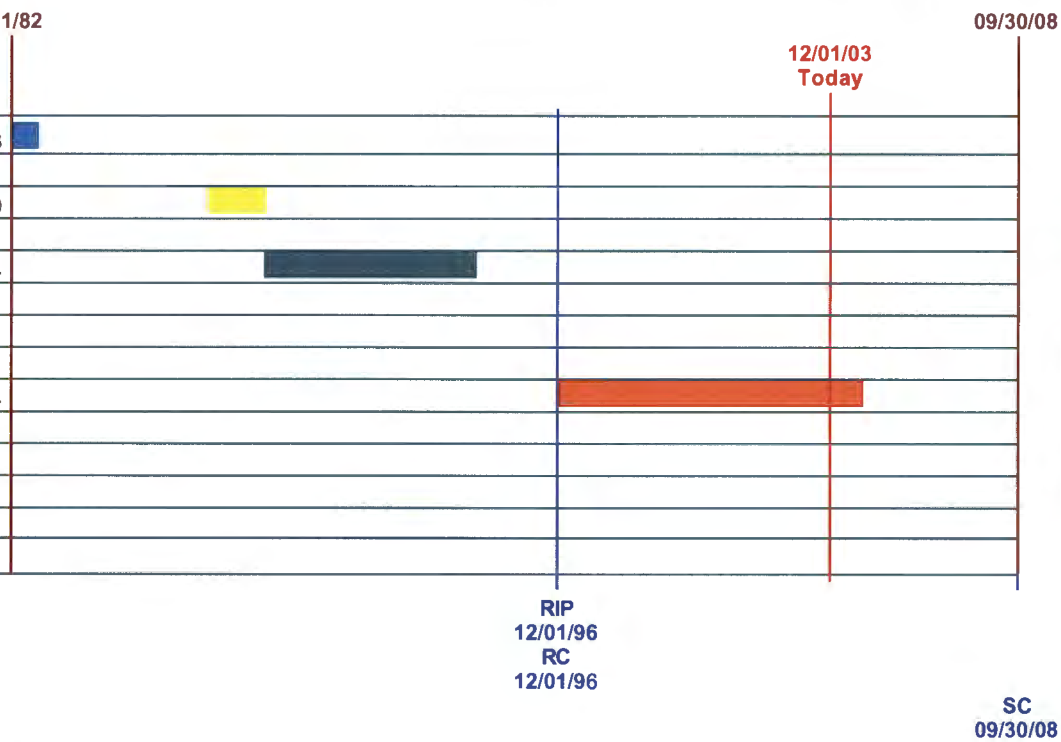
SITE 21 WEST ARE

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF021

Relative Risk: NR

	Start Date	End Date
PA	12/01/82	08/01/83
SI		
RI	01/01/88	06/01/89
FS		
ROD/DD	06/01/89	10/26/94
RD		
RA-C		
RA-O		
LTM	12/01/96	09/30/04



LF022

Site Name: SITE 22 WEST AREA LANDFILL #1
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $10,245
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

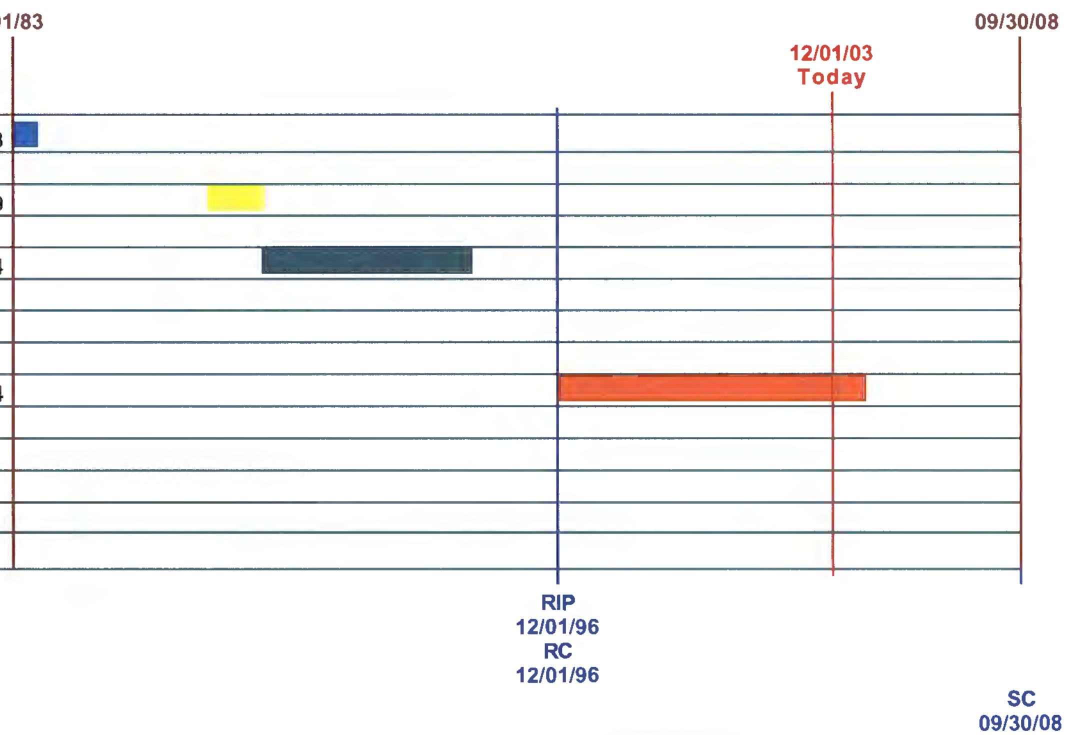
Site description:

SITE 22 WEST ARE

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF022
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	01/01/88	06/01/89
FS		
ROD/DD	06/01/89	09/30/94
RD		
RA-C		
RA-O		
LTM	12/01/96	09/30/04



LF023

Site Name:	SITE 23 MOBS LANDFILL
Current site phase status:	LTM
Relative Risk:	NR
Prior year funding (FY03):	$10,245
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

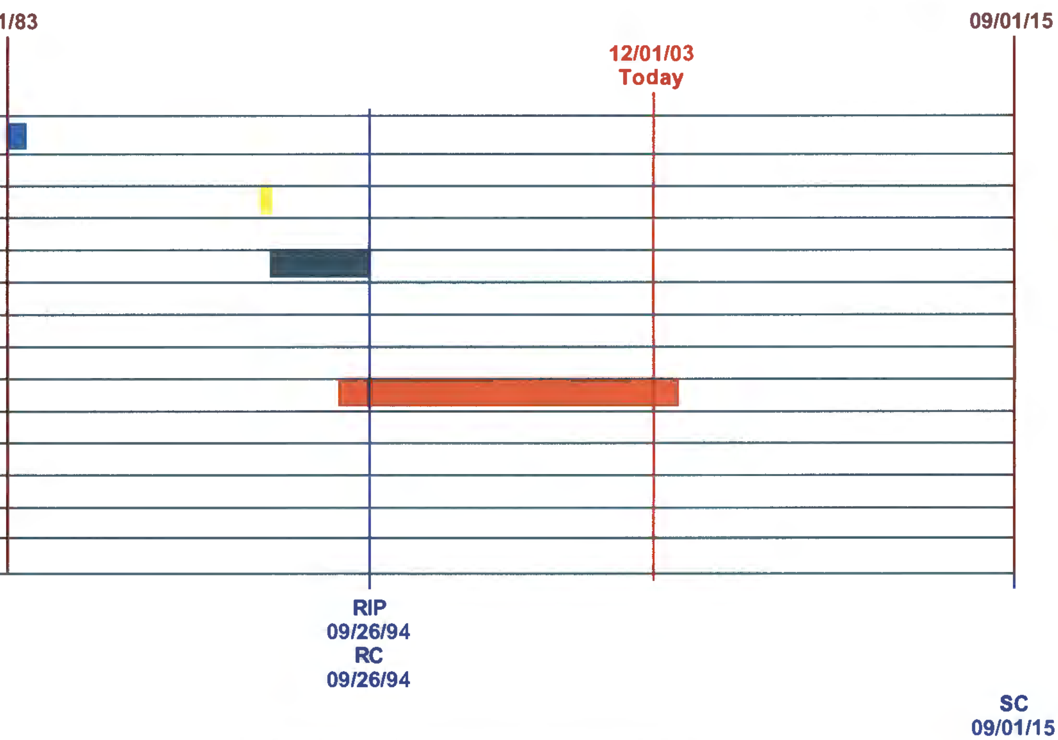
SITE 23 MOBS LAN

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF023

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/26/94
RD		
RA-C		
RA-O		
LTM	10/01/93	09/30/04



OT024

Site Name: SITE 24 FORMER MAINT. AREA
Current site phase status: NFRAP IV
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

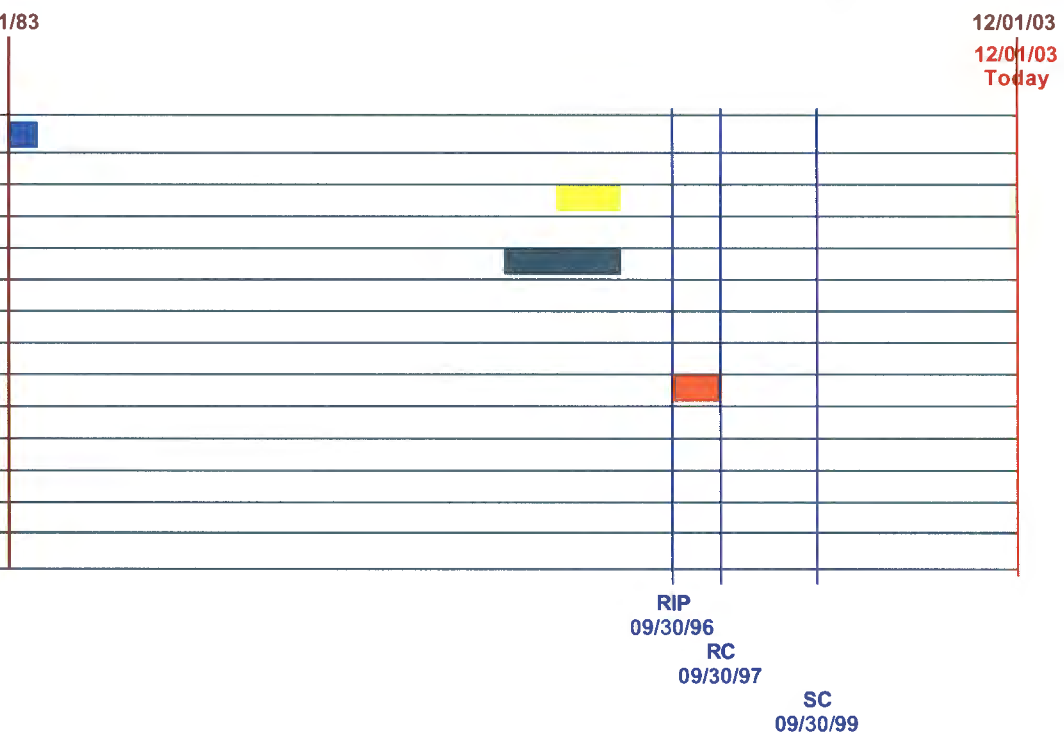
Site description:

OT-24 FORMER EQUIP MAINT AREA

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT024
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	06/01/94	09/01/95
FS		
ROD/DD	09/01/95	04/29/93
RD		
RA-C		
RA-O		
LTM	09/30/96	09/30/97



SD025

Site Name:	POSSIBLE DRAINAGE DISPOSAL SITE
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

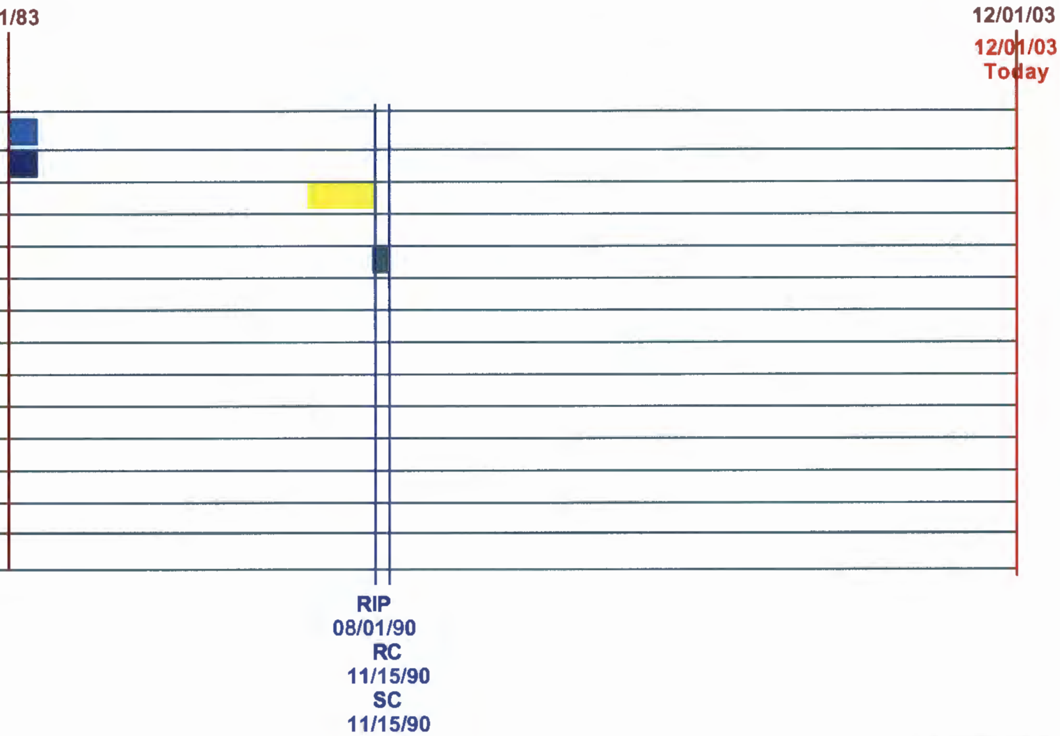
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SD025

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	01/01/83	08/01/83
RI	04/01/89	08/01/90
FS		
ROD/DD	08/01/90	11/15/90
RD		
RA-C		
RA-O		
LTM		



SS026

Site Name:	POSS MISSILE FUEL SPILL SITE
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

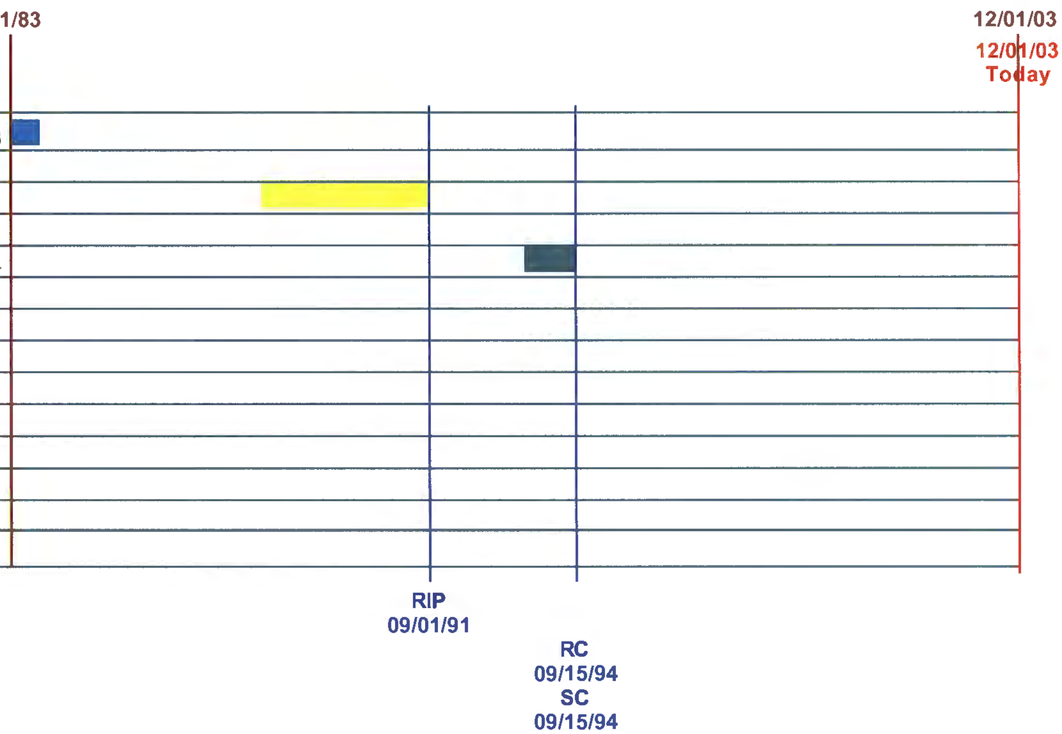
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS026

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/88	09/01/91
FS		
ROD/DD	09/01/93	09/15/94
RD		
RA-C		
RA-O		
LTM		



SD027

Site Name:	SITE 27 PAD 9 WASHRACK AREA - RAD Waste	
Current site phase status:	NFRAP II	
Relative Risk:	NR	
Prior year funding (FY03):		$0
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$0

Site description:

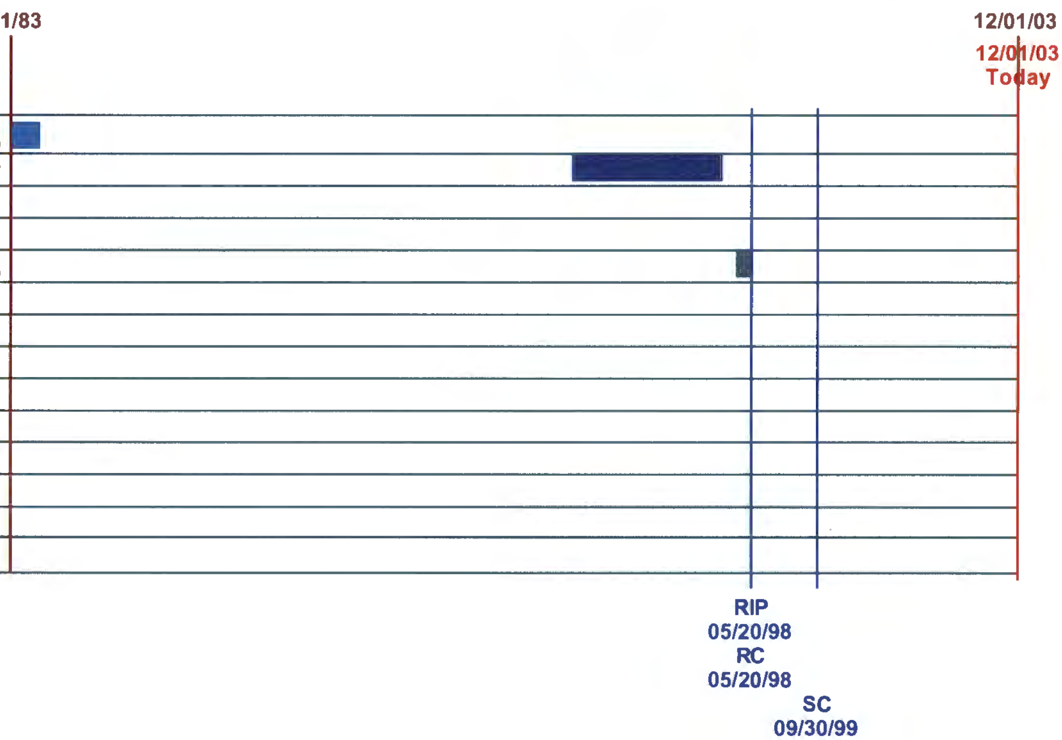
SD-27 PAD 9 WASHRACK

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SD027

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/94	09/30/97
RI		
FS		
ROD/DD	01/30/98	05/20/98
RD		
RA-C		
RA-O		
LTM		



SD028

Site Name: FORMER NORTH AREA WASHRACK ST
Current site phase status: NFRAP III
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

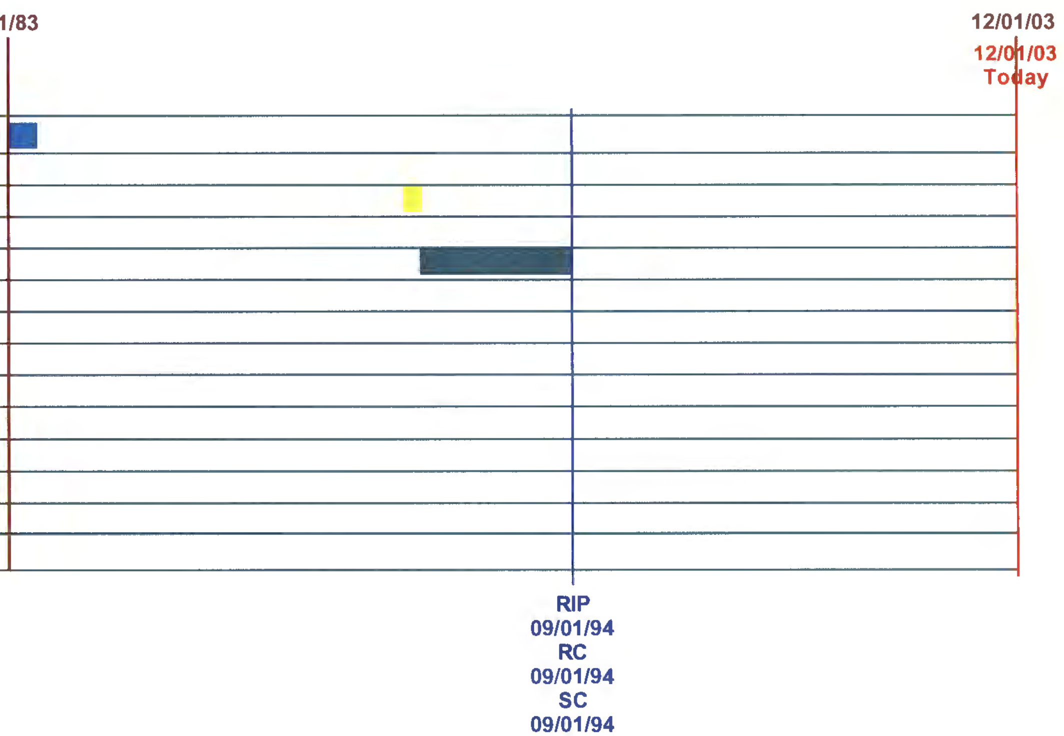
Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SD028
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/01/94
RD		
RA-C		
RA-O		
LTM		



LF029

Site Name: ARMY LANDFILL
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $16,393
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $22,300

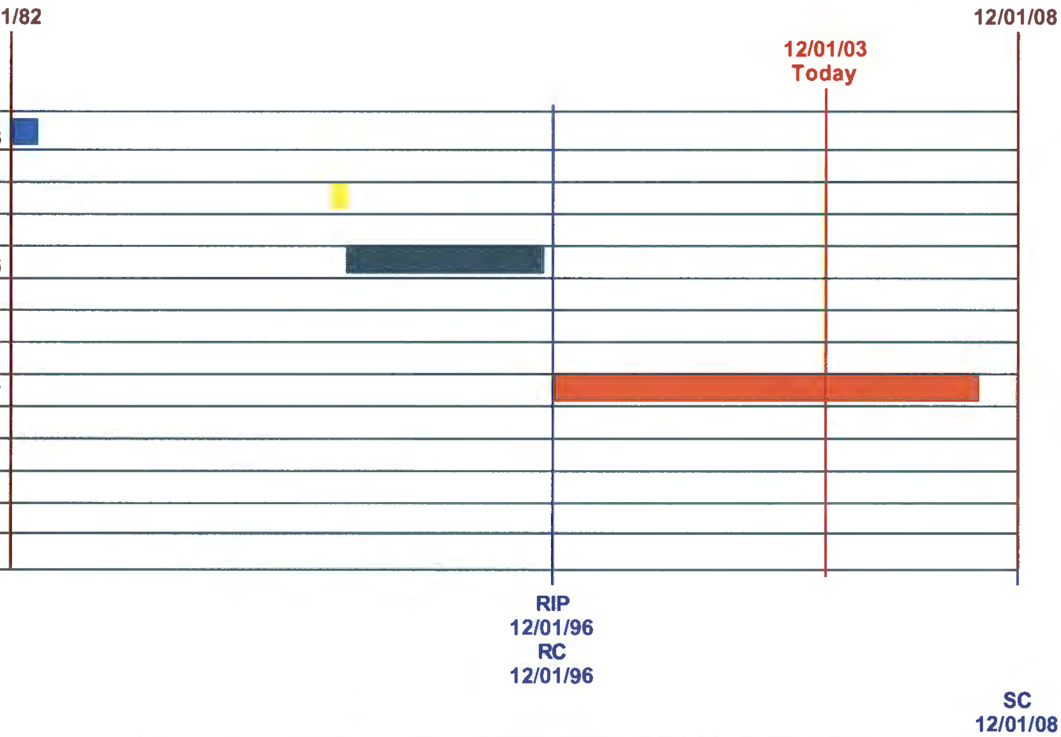
Site description:

LF-29 LANDFILL

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF029
Relative Risk: NR

	Start Date	End Date
PA	12/01/82	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/01/96
RD		
RA-C		
RA-O		
LTM	12/01/96	12/01/07



DP030

Site Name: ST 30 GREASE TRAP DISPOSAL PITS
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

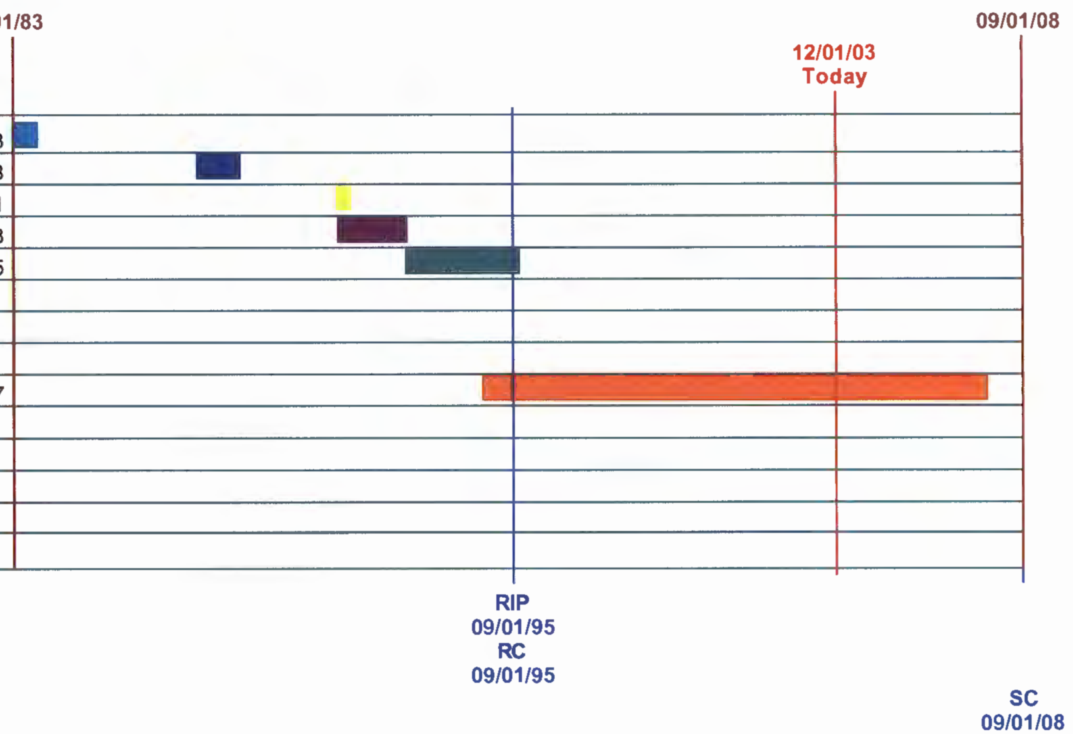
Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** DP030
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	04/01/91	08/01/91
FS	04/01/91	01/01/93
ROD/DD	01/01/93	11/03/95
RD		
RA-C		
RA-O		
LTM	12/01/94	09/30/07



FT031

Site Name: SITE 31 FDTA
Current site phase status: RA-O
Relative Risk: NR
Prior year funding (FY03): $768,770
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $25,000

Site description:

FT-31 FIRE TRAINING AREA

Remedy Type:

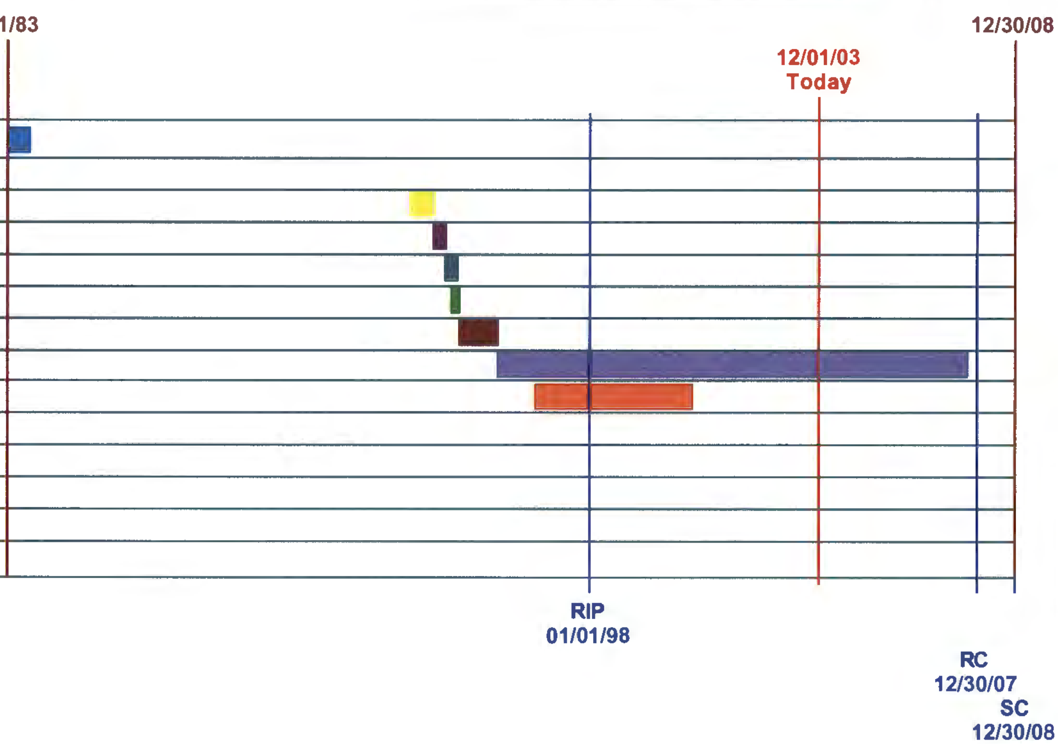
Remedy Type	Phase	Start Date	End Date
Bioventing	RA-C	09/01/94	09/01/95

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** FT031

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	06/01/93	12/30/93
FS	12/30/93	05/01/94
ROD/DD	05/01/94	08/15/94
RD	07/01/94	09/01/94
RA-C	09/01/94	09/01/95
RA-O	09/01/95	09/30/07
LTM	09/01/96	09/01/00



OT032

Site Name:	COLLAPSED SEWER LINE FRM PRIMATE
Current site phase status:	NFRAP II
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

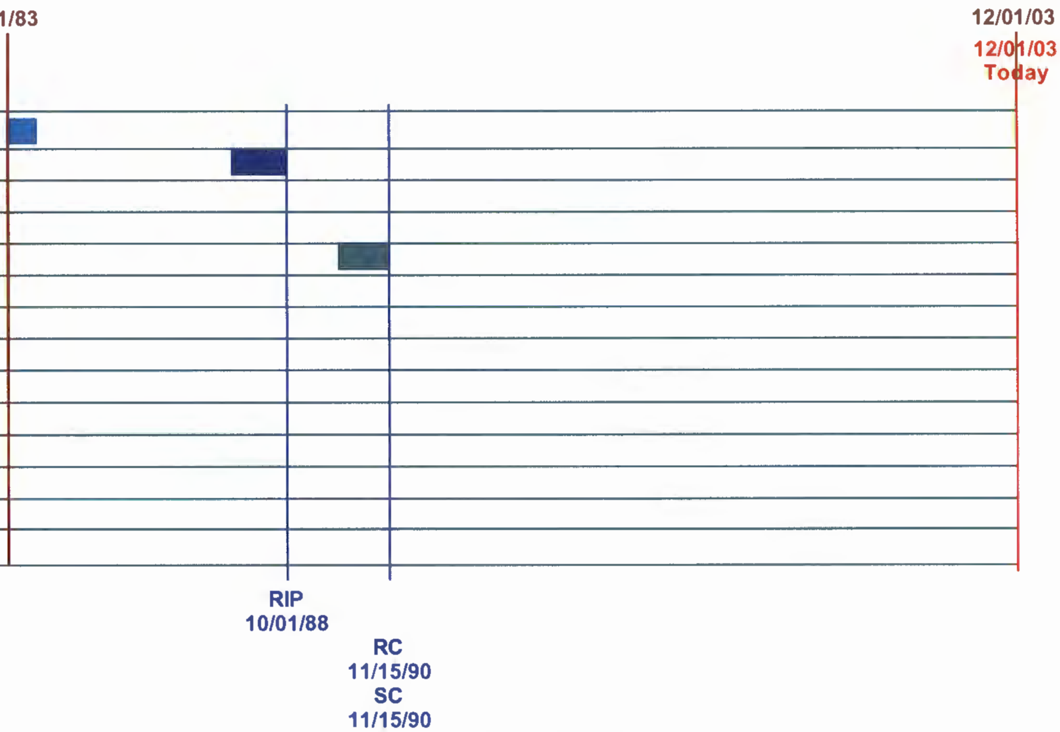
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT032

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI		
FS		
ROD/DD	11/15/89	11/15/90
RD		
RA-C		
RA-O		
LTM		



SD033

Site Name: COOKING GREASE DISPOSAL TRENCH
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

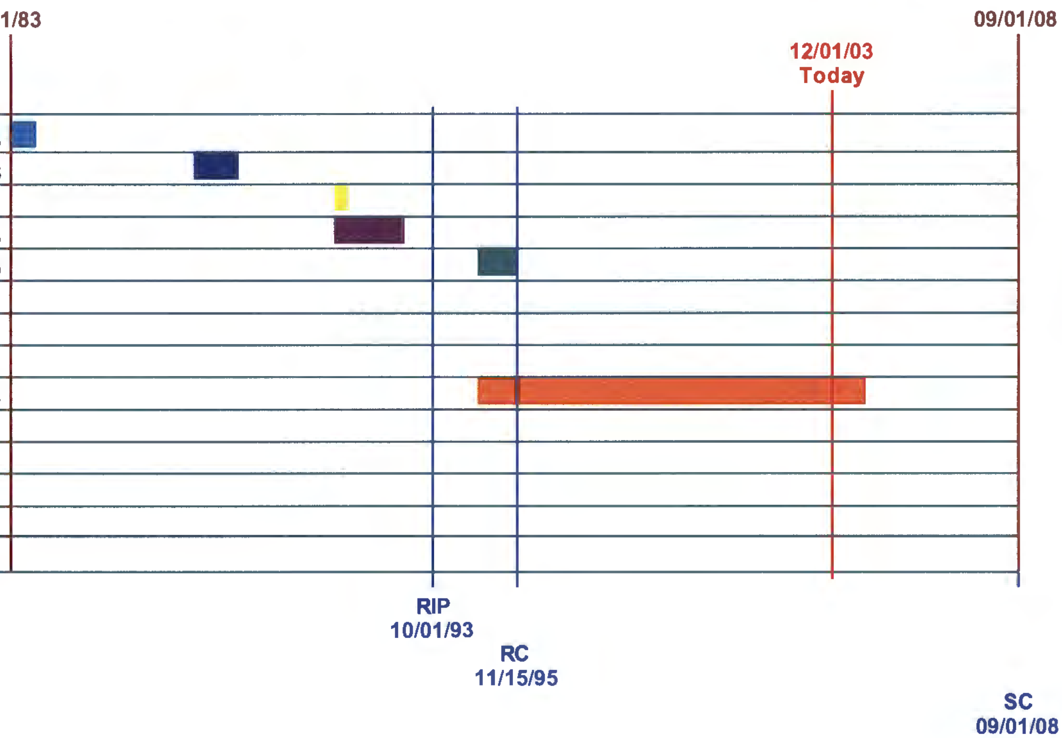
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SD033

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	04/01/91	08/01/91
FS	04/01/91	01/01/93
ROD/DD	12/01/94	11/15/95
RD		
RA-C		
RA-O		
LTM	12/01/94	09/30/04



OT034

Site Name:	SPENT MUNITIONS BURIAL SITE
Current site phase status:	NFRAP I
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

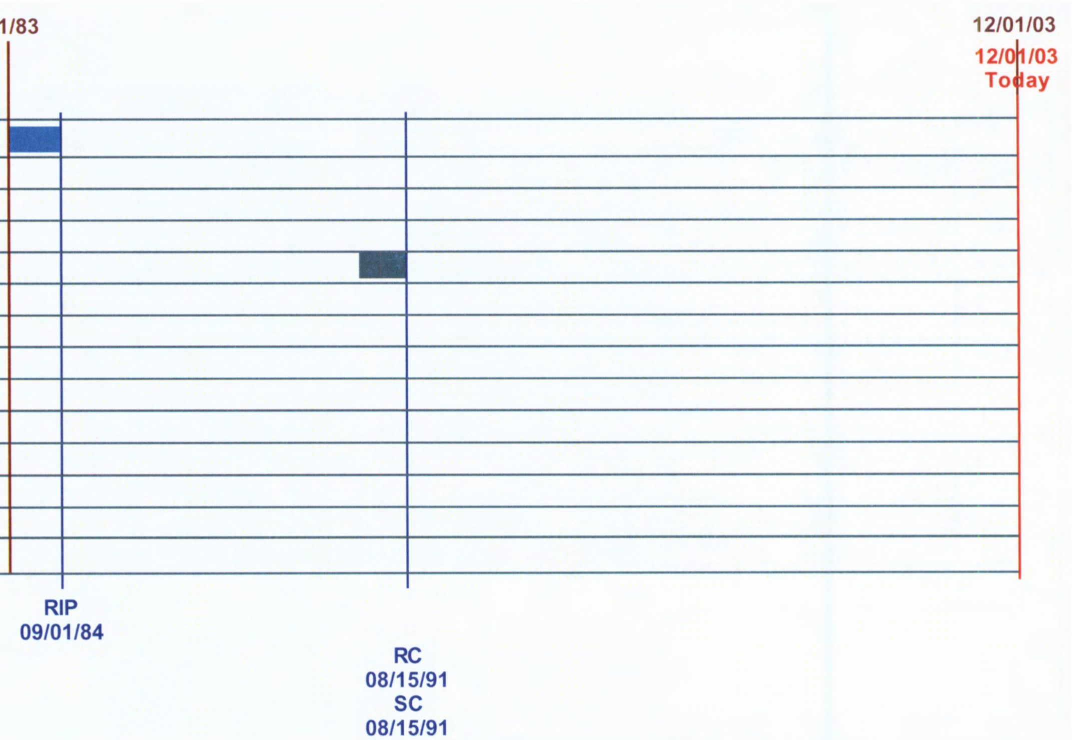
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT034

Relative Risk: NR

	Start Date	End Date
PA	09/01/83	09/01/84
SI		
RI		
FS		
ROD/DD	09/15/90	08/15/91
RD		
RA-C		
RA-O		
LTM		



OT035

Site Name:	SPENT SOLVENT DISPOSAL AREA - RAD Waste
Current site phase status:	NFRAP II
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

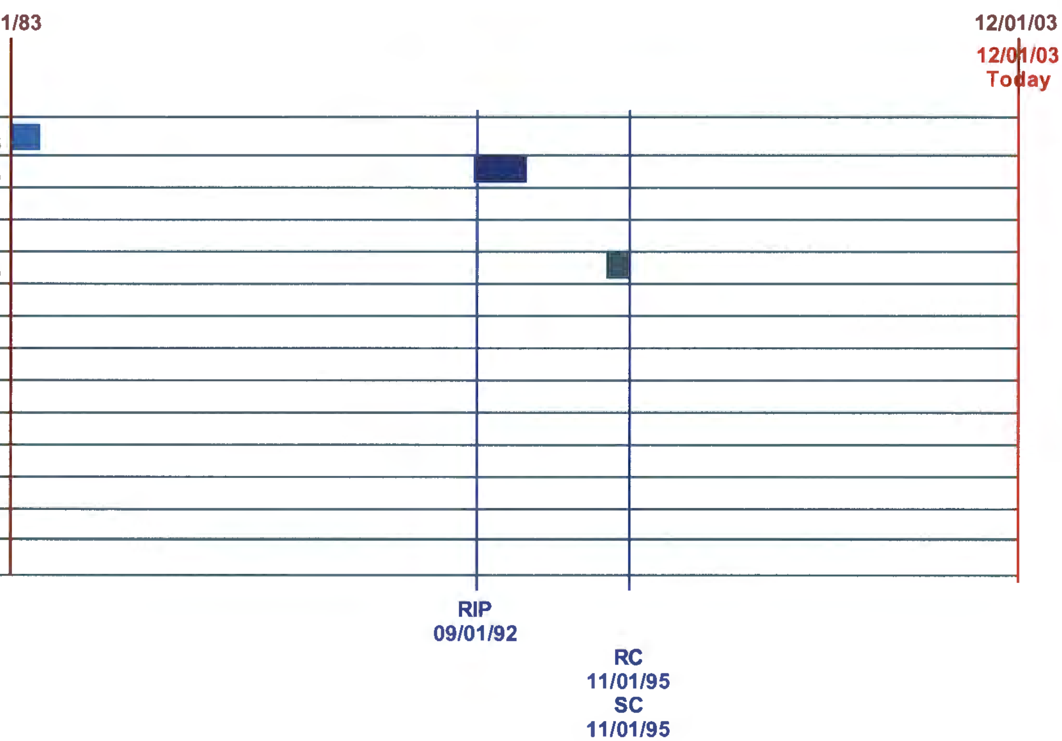
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT035

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/92	09/01/93
RI		
FS		
ROD/DD	05/30/95	11/01/95
RD		
RA-C		
RA-O		
LTM		



SS036

Site Name:	UNCONVENTIONAL FUEL AREA SPILL
Current site phase status:	NFRAP IV
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

SS-36 FUEL SPILL

Remedy Type:

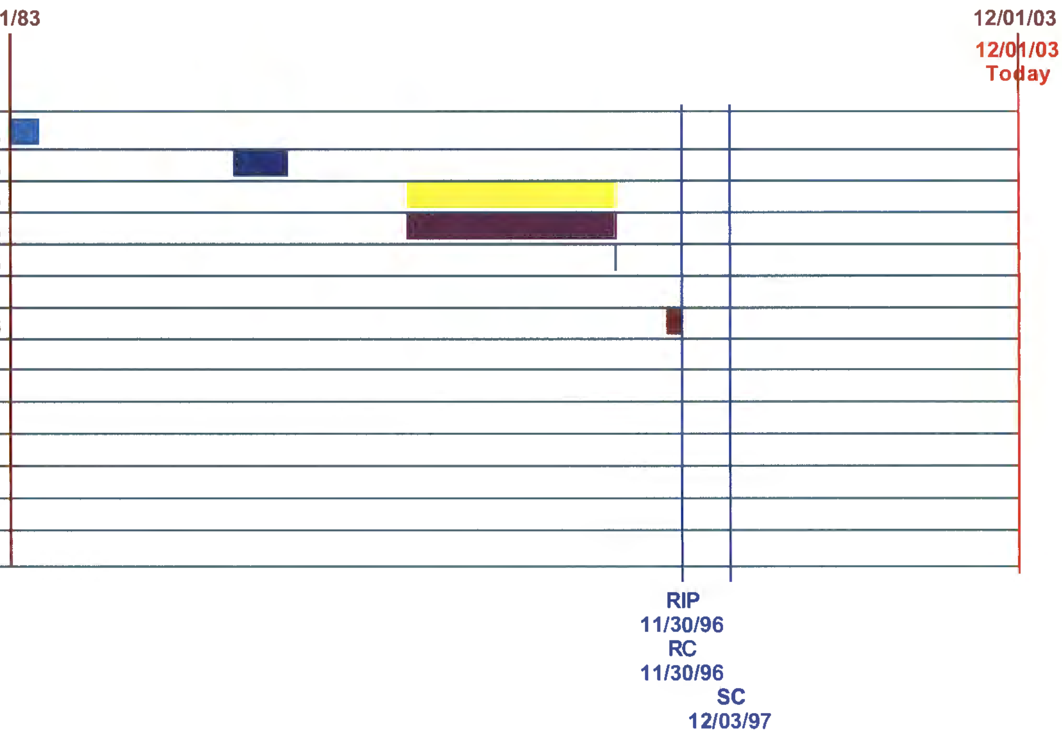
Remedy Type	Phase	Start Date	End Date
Removal	RA-C	08/30/96	11/30/96

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS036

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	04/01/91	08/01/95
FS	04/01/91	08/01/95
ROD/DD	08/01/95	08/01/95
RD		
RA-C	08/30/96	11/30/96
RA-O		
LTM		



OT037

Site Name:	EARLY MISSILE TESTING SITE
Current site phase status:	NFRAP III
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

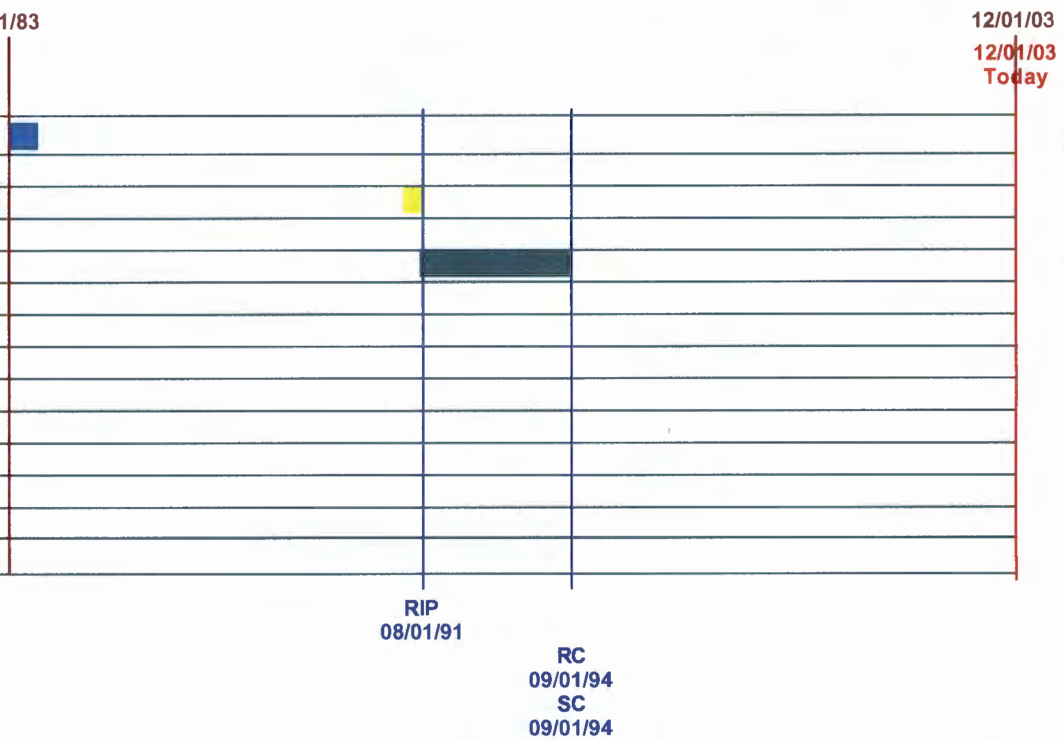
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT037

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/01/94
RD		
RA-C		
RA-O		
LTM		



OT038

Site Name: TEST SLED MAINTENANCE AREA
Current site phase status: NFRAP III
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT038
Relative Risk: NR

01/01/83 12/01/03 12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/01/94
RD		
RA-C		
RA-O		
LTM		

RIP
09/01/94
RC
09/01/94
SC
09/01/94

SS039

Site Name: SITE 39 MISSILE FUEL SP AREA
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $22,300

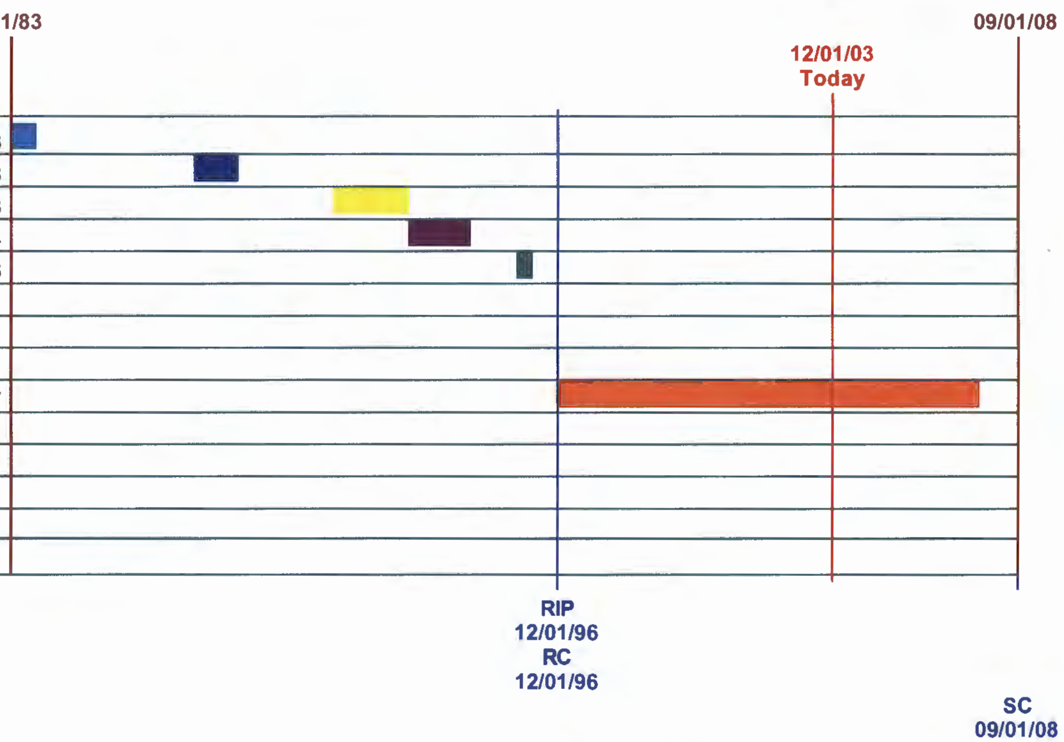
Site description:

SS-39 MISSLE FUEL SPILL AREA

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS039
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	04/01/91	03/01/93
FS	03/01/93	09/01/94
ROD/DD	12/01/95	03/30/96
RD		
RA-C		
RA-O		
LTM	12/01/96	09/01/07



LF040

Site Name: CAUSEWAY RUBBLE DISPOSAL SITE
Current site phase status: NFRAP I
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF040
Relative Risk: NR

01/01/83 12/01/03
12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI		
FS		
ROD/DD	08/15/90	08/15/91
RD		
RA-C		
RA-O		
LTM		

RIP
08/15/91
RC
08/15/91
SC
08/15/91

OT041

Site Name: COCO BLOCK HOUSE BORE HOLE DISPO
Current site phase status: NFRAP III
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT041
Relative Risk: NR

01/01/83
12/01/03
12/01/03
Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/01/94
RD		
RA-C		
RA-O		
LTM		

RIP
09/01/94
RC
09/01/94
SC
09/01/94

RW042

Site Name:	RADIOACTIVE MAT'L BURIAL SITE
Current site phase status:	NFRAP II
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** RW042

Relative Risk: NR

01/01/83

12/01/03

12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI		
FS		
ROD/DD		
RD		
RA-C		
RA-O		
LTM		

RIP 10/01/93
RC 10/01/93
SC 10/01/93

DP043

Site Name:	ATLAS ELECTRICAL SUBSTATION	
Current site phase status:	NFRAP III	
Relative Risk:	NR	
Prior year funding (FY03):		$0
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** DP043

Relative Risk: NR

01/01/83 12/01/03

12/01/03 Today

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/01/94
RD		
RA-C		
RA-O		
LTM		

RIP 09/01/94
RC 09/01/94
SC 09/01/94

OT044

Site Name: SITE 50 BLDG 301 AC MAINT HANGAR
Current site phase status: LTM
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

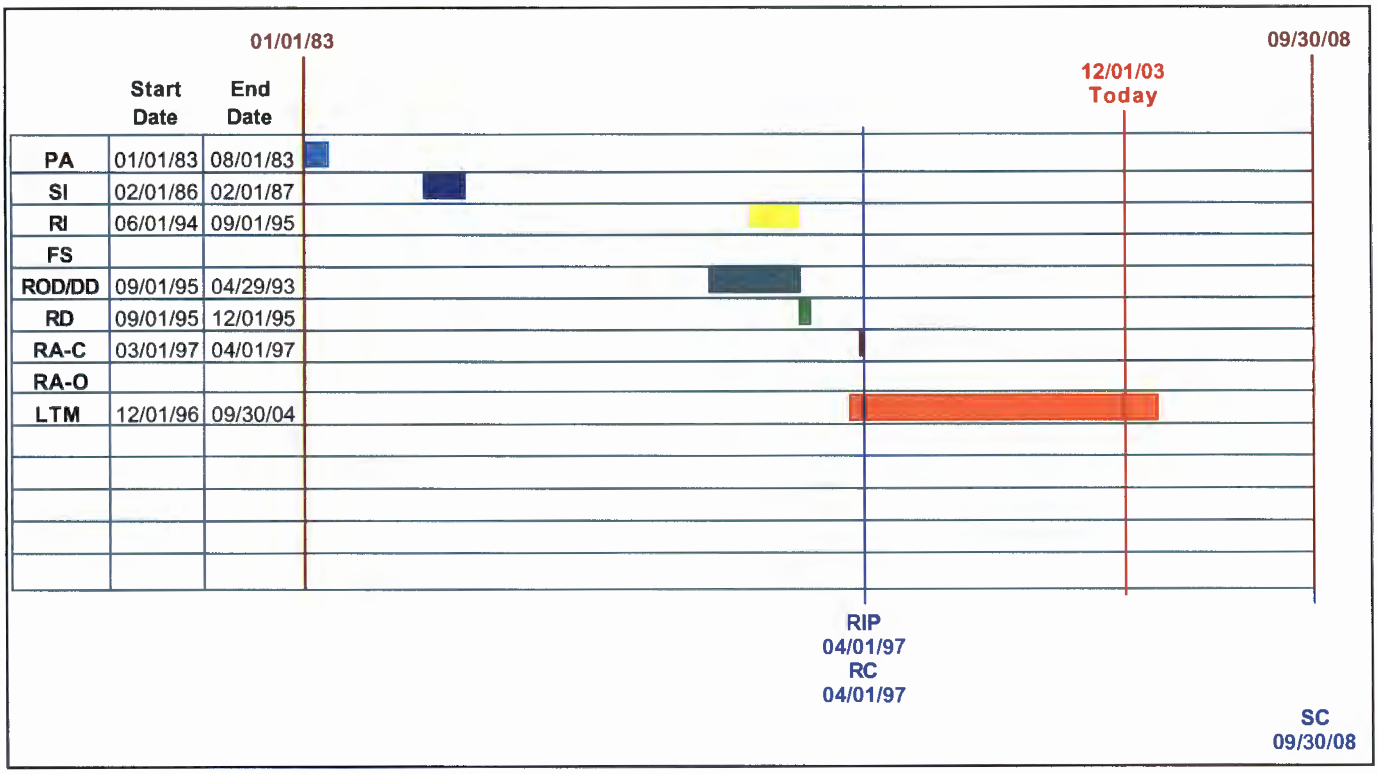
OT-44 ACFT MAINT HANGER

Remedy Type:

Remedy Type	Phase	Start Date	End Date
Removal	RA-C	03/01/97	04/01/97

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT044
Relative Risk: NR



	Start Date	End Date
PA	01/01/83	08/01/83
SI	02/01/86	02/01/87
RI	06/01/94	09/01/95
FS		
ROD/DD	09/01/95	04/29/93
RD	09/01/95	12/01/95
RA-C	03/01/97	04/01/97
RA-O		
LTM	12/01/96	09/30/04

OT045

Site Name:	SITE 51 OLD AGE REFUELING ST
Current site phase status:	NFRAP IV
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

OT-45 AGE REFUELING STATION

Remedy Type:

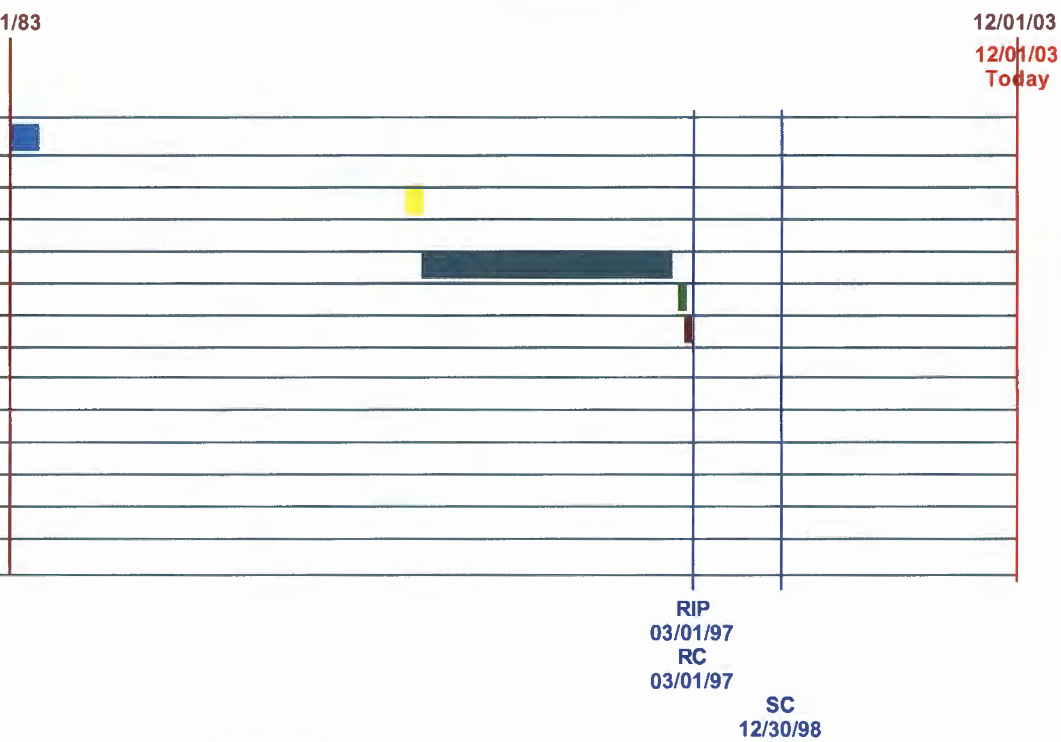
Remedy Type	Phase	Start Date	End Date
Removal	RA-C	01/02/97	03/01/97

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT045

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	04/01/91	08/01/91
FS		
ROD/DD	08/01/91	09/18/96
RD	11/18/96	01/01/97
RA-C	01/02/97	03/01/97
RA-O		
LTM		



SS046

Site Name:	JP-4 SPILL
Current site phase status:	LTM
Relative Risk:	NR
Prior year funding (FY03):	$14,344
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$22,300

Site description:

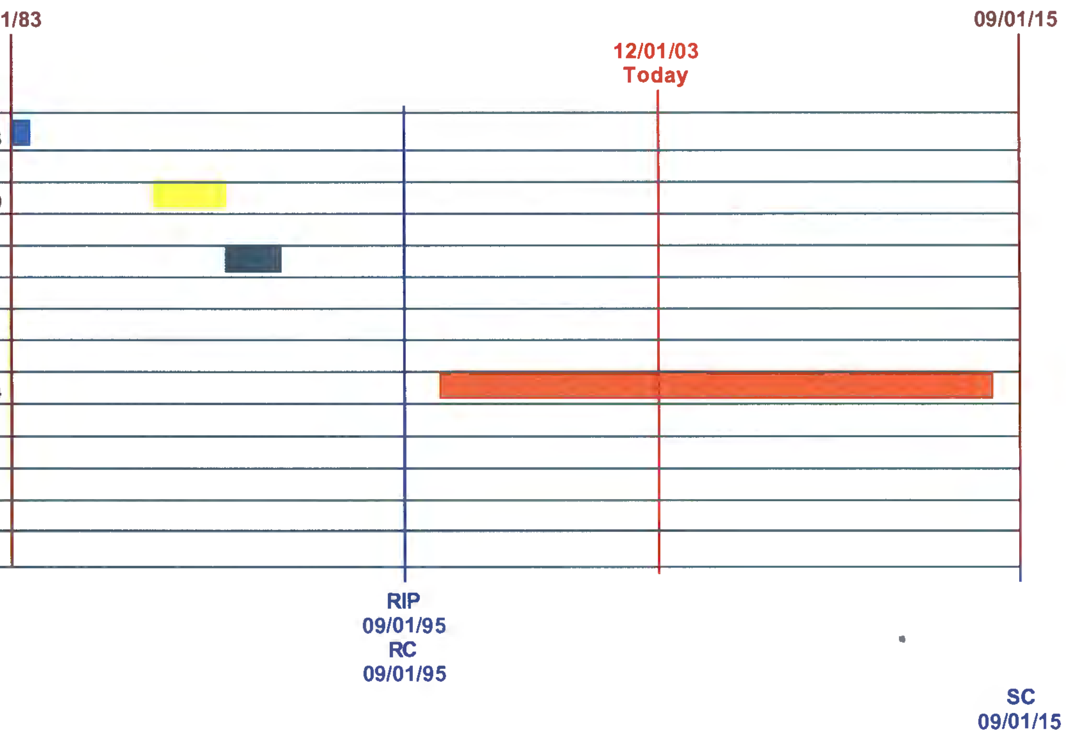
JP-4 SPILL

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS046

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	08/01/87	12/01/89
FS		
ROD/DD	12/01/89	09/15/91
RD		
RA-C		
RA-O		
LTM	12/01/96	09/30/14



SD047

Site Name:	POL WASHRACK DISCHARGE
Current site phase status:	NFRAP IV
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

SD-47 POL WASHRACK

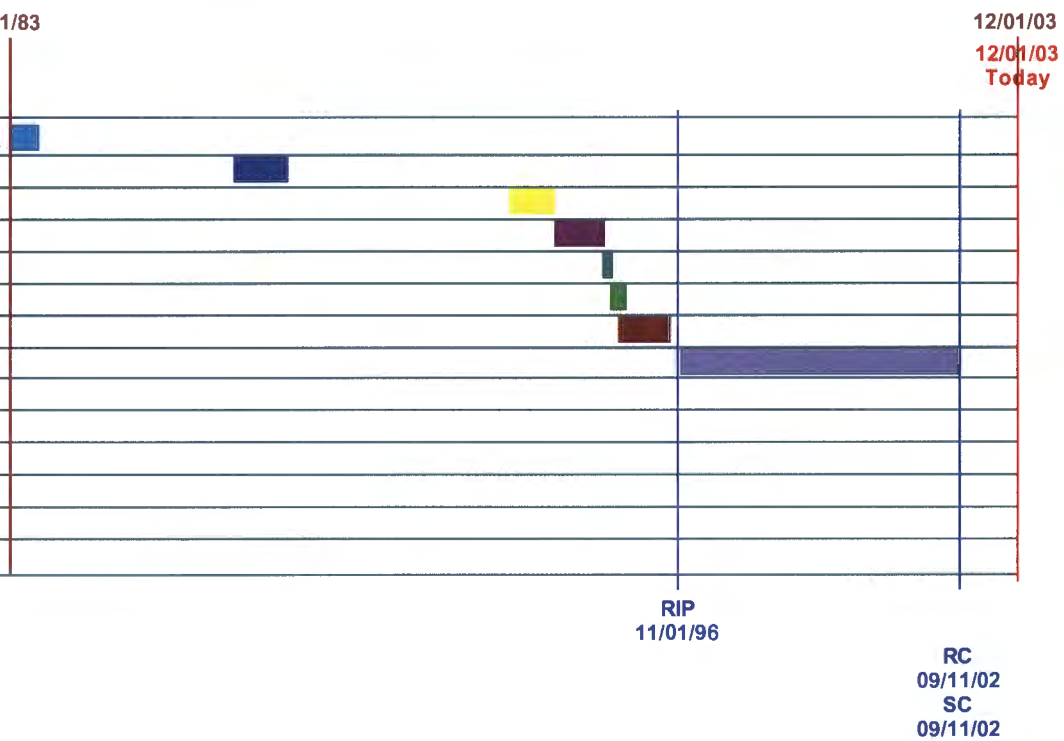
Remedy Type:

Remedy Type	Phase	Start Date	End Date
Bioventing	RA-C	08/30/95	08/30/96

Site Phase Schedule

MAJCOM: ACC	**Installation:** HOLLOMAN	**Site ID:** SD047
		Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	06/01/93	05/01/94
FS	05/01/94	05/01/95
ROD/DD	05/01/95	06/18/95
RD	07/01/95	09/30/95
RA-C	08/30/95	08/30/96
RA-O	12/01/96	09/11/02
LTM		



SS048

Site Name: MILITARY GAS STATION
Current site phase status: RA-O
Relative Risk: NR
Prior year funding (FY03): $14,344
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $25,000

Site description:

MILITARY GAS STA

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS048

Relative Risk: NR

01/01/83 12/01/03 Today 09/30/13

	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	08/01/87	12/01/89
FS		
ROD/DD	12/01/89	09/18/91
RD		
RA-C		
RA-O	03/06/01	12/30/08
LTM	12/01/96	09/30/13

RIP 09/01/95

RC 12/30/08
SC 09/01/09

WP049

Site Name: SITE INVEST WP-49 SEWAGE TREAT LAGOONS
Current site phase status: RA-O
Relative Risk: NR
Prior year funding (FY03): $230,631
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $207,000

Site description:

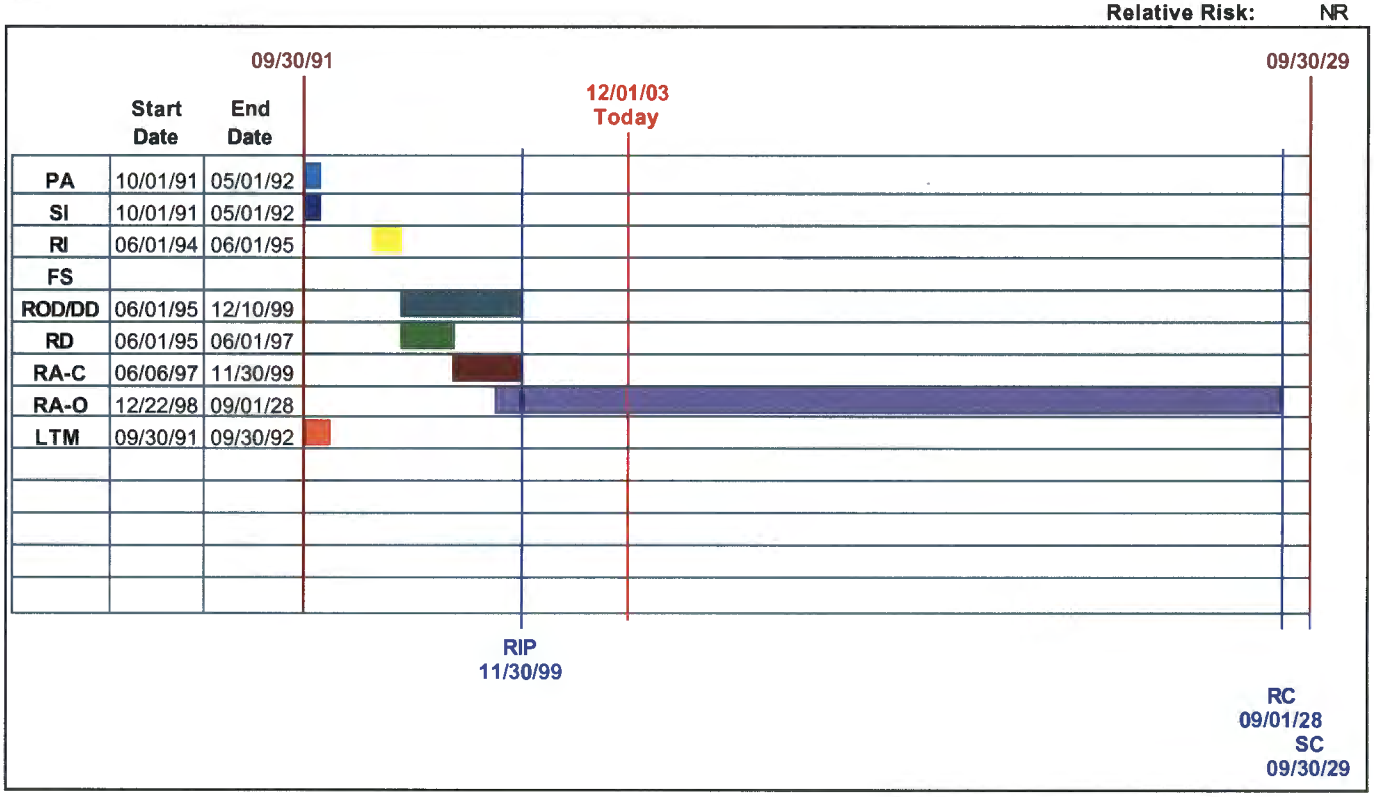
WP-49 SEWAGE LAGOON

Remedy Type:

Remedy Type	Phase	Start Date	End Date
Capping	RA-C	06/06/97	11/30/99

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** WP049
Relative Risk: NR



	Start Date	End Date
PA	10/01/91	05/01/92
SI	10/01/91	05/01/92
RI	06/01/94	06/01/95
FS		
ROD/DD	06/01/95	12/10/99
RD	06/01/95	06/01/97
RA-C	06/06/97	11/30/99
RA-O	12/22/98	09/01/28
LTM	09/30/91	09/30/92

WP050

Site Name: IRA REMOVE DRUMS SITE WP-50
Current site phase status: NFRAP II
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

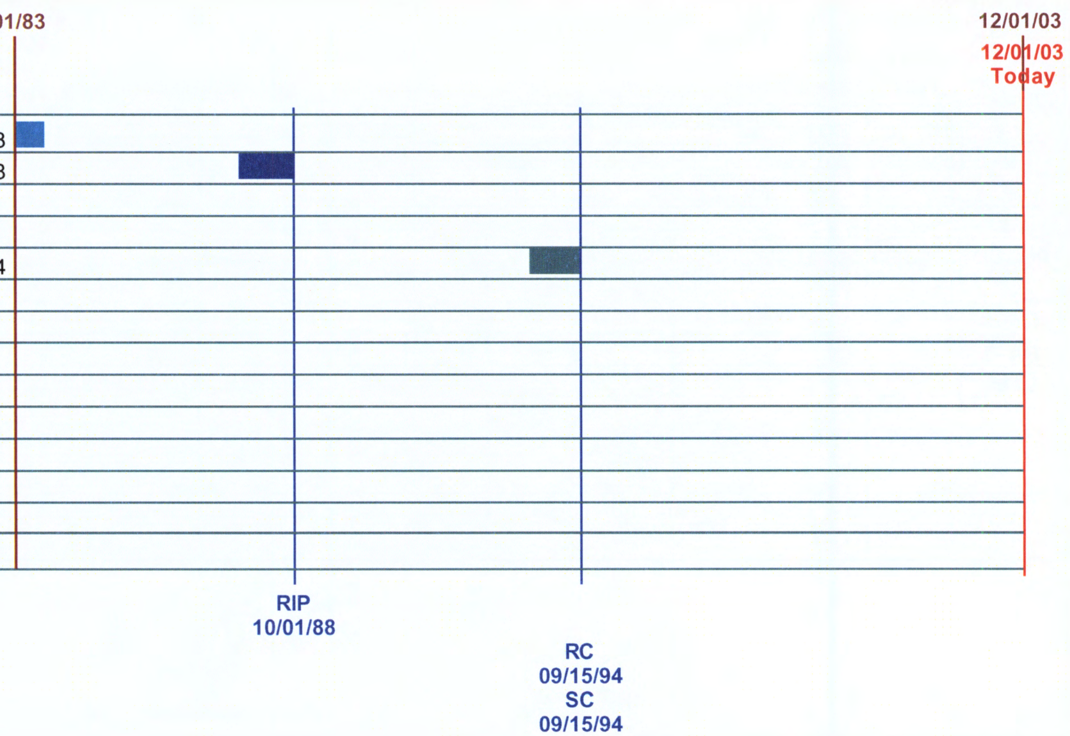
Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** WP050
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI		
FS		
ROD/DD	09/15/93	09/15/94
RD		
RA-C		
RA-O		
LTM		



RW051

Site Name: PRIMATE RESEARCH LAB
Current site phase status: NFRAP II
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

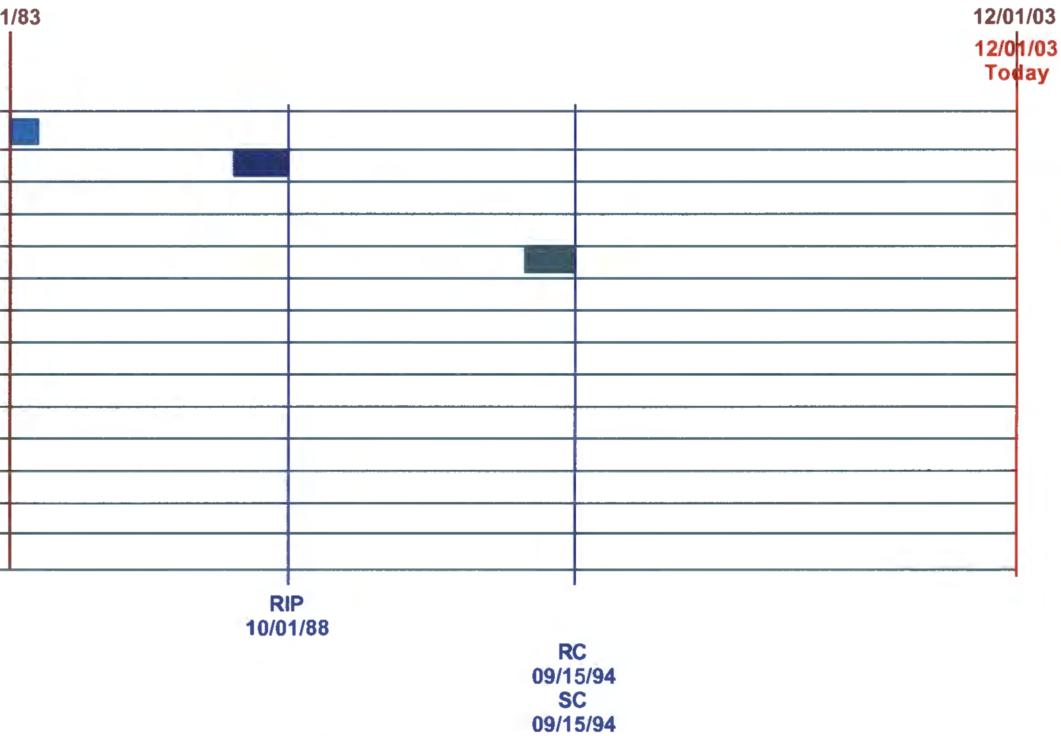
Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** RW051
Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI		
FS		
ROD/DD	09/15/93	09/15/94
RD		
RA-C		
RA-O		
LTM		



OT052

Site Name: BOLES & SAN ANDRES WELLFIELD AREA
Current site phase status: NFRAP I
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT052
Relative Risk: NR

09/01/83

12/01/03

12/01/03 Today

	Start Date	End Date
PA	09/01/83	09/01/84
SI		
RI		
FS		
ROD/DD	09/15/90	08/15/91
RD		
RA-C		
RA-O		
LTM		

RIP 09/01/84

RC 08/15/91
SC 08/15/91

OT053

Site Name:	BONITA LAKE	
Current site phase status:	NFRAP I	
Relative Risk:	NR	
Prior year funding (FY03):		$0
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$0

Site description:

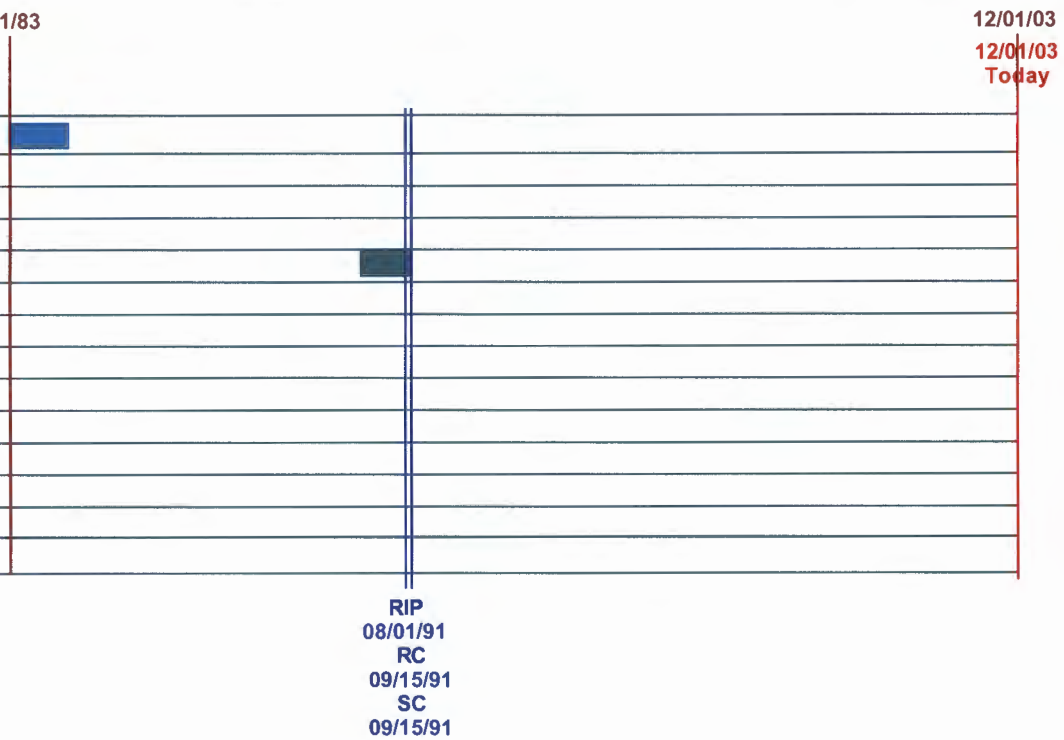
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT053

Relative Risk: NR

	Start Date	End Date
PA	09/01/83	11/01/84
SI		
RI		
FS		
ROD/DD	09/15/90	09/15/91
RD		
RA-C		
RA-O		
LTM		



OT054

Site Name:	SILVER CITY RADAR SITE
Current site phase status:	NFRAP I
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

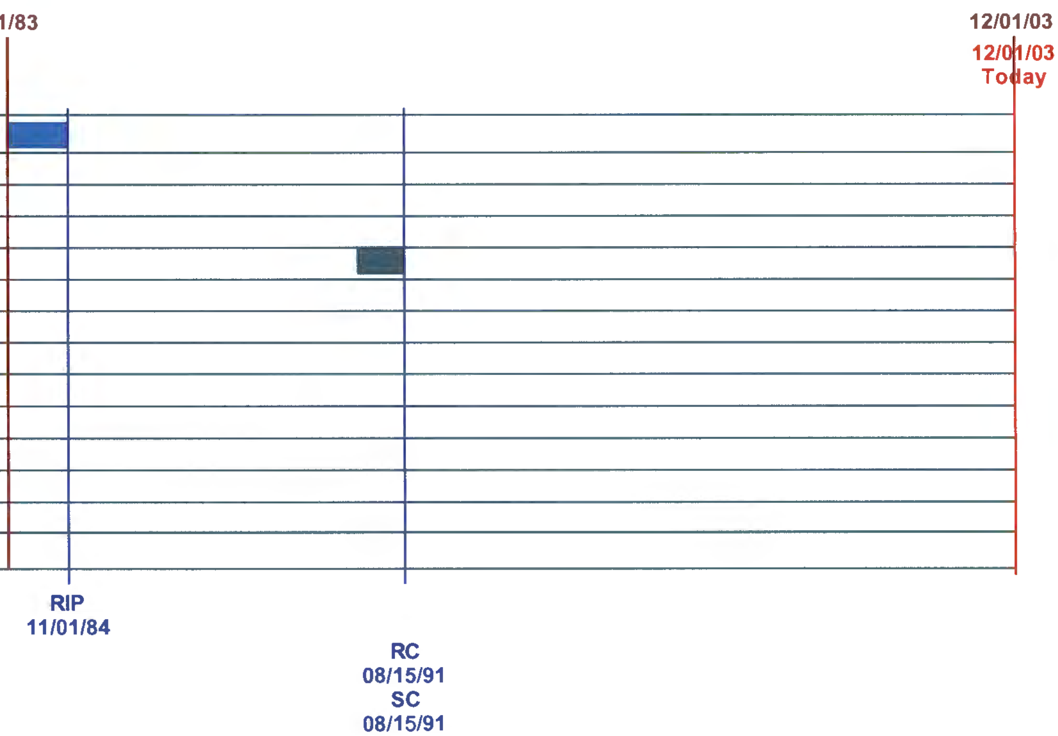
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT054

Relative Risk: NR

	Start Date	End Date
PA	09/01/83	11/01/84
SI		
RI		
FS		
ROD/DD	09/15/90	08/15/91
RD		
RA-C		
RA-O		
LTM		



OT055

Site Name:	EL PASO RADAR SITE	
Current site phase status:	NFRAP I	
Relative Risk:	NR	
Prior year funding (FY03):		$0
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$0

Site description:

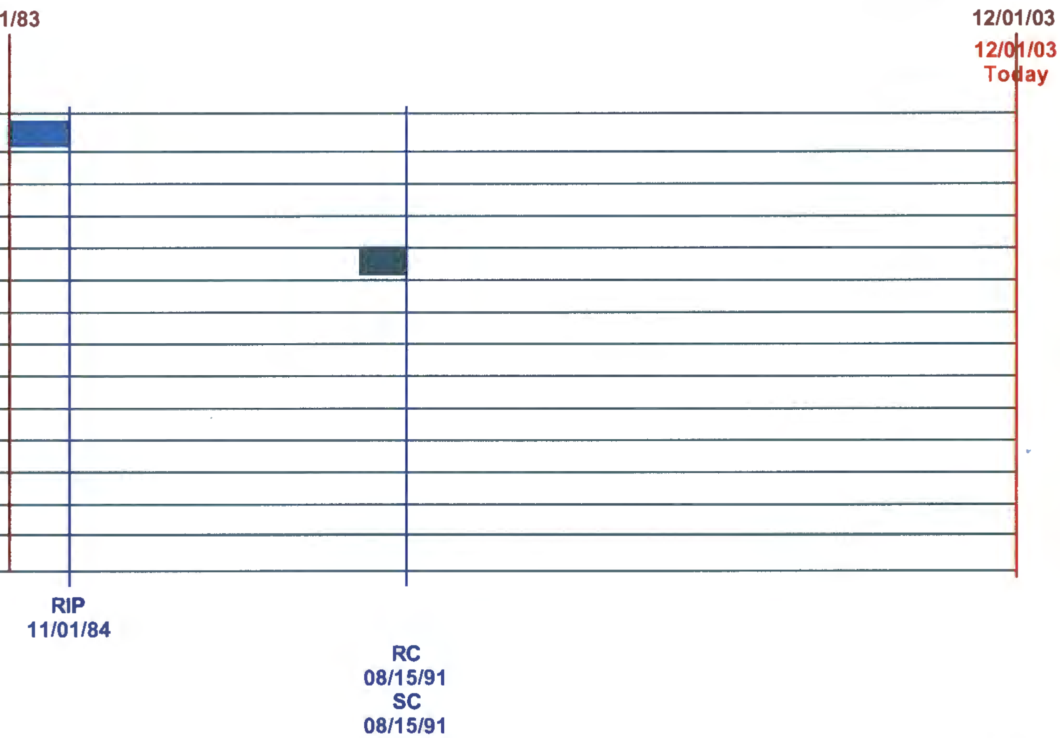
This site has final remedy in place.

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** OT055

Relative Risk: NR

	Start Date	End Date
PA	09/01/83	11/01/84
SI		
RI		
FS		
ROD/DD	09/15/90	08/15/91
RD		
RA-C		
RA-O		
LTM		



SS056

Site Name:	WEST RAMP FUEL SPILL	
Current site phase status:	LTM	
Relative Risk:	NR	
Prior year funding (FY03):		$14,344
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$0

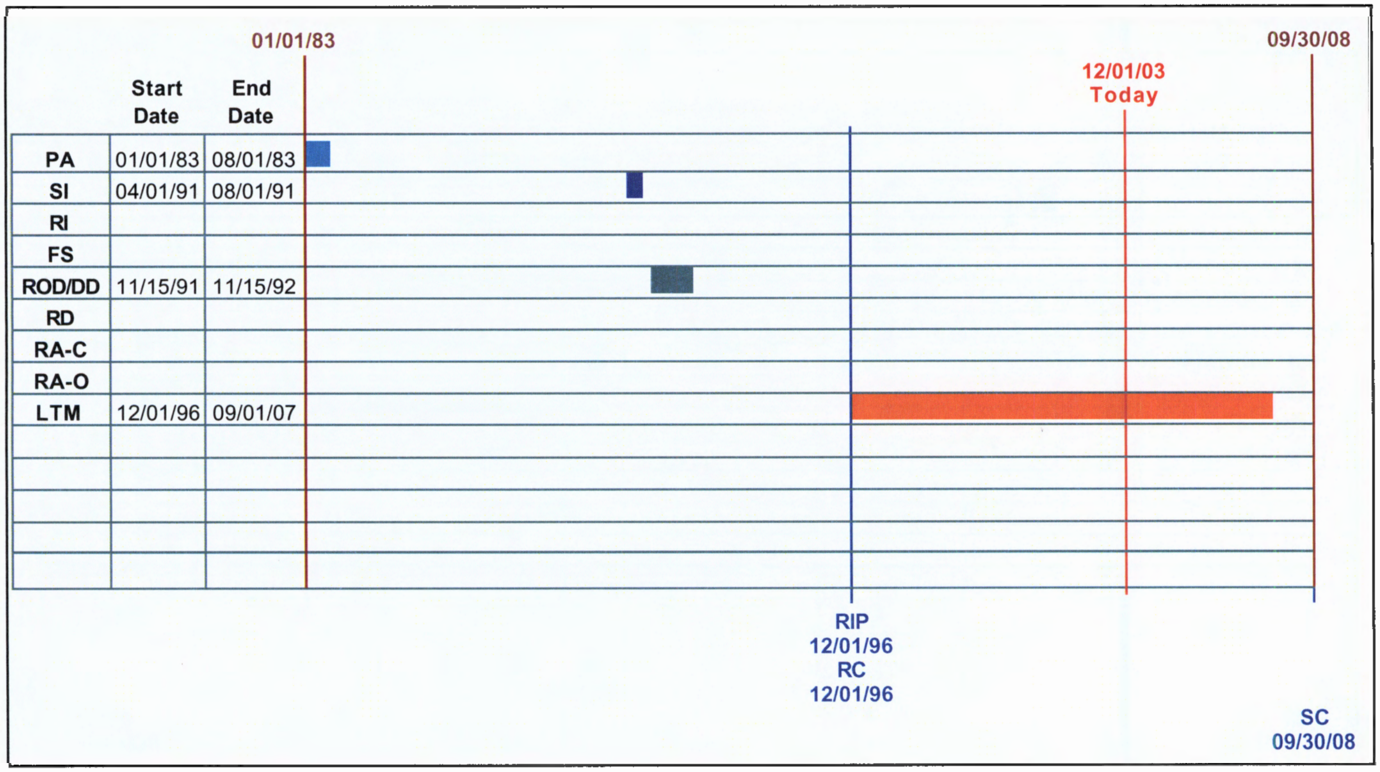
Site description:

WEST RAMP FUEL S

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS056

Relative Risk: NR



	Start Date	End Date
PA	01/01/83	08/01/83
SI	04/01/91	08/01/91
RI		
FS		
ROD/DD	11/15/91	11/15/92
RD		
RA-C		
RA-O		
LTM	12/01/96	09/01/07

SS057

Site Name:	OFFICER'S CLUB
Current site phase status:	RA-O
Relative Risk:	NR
Prior year funding (FY03):	$179,380
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$25,000

Site description:

SS-57 OFFICER'S CLUB

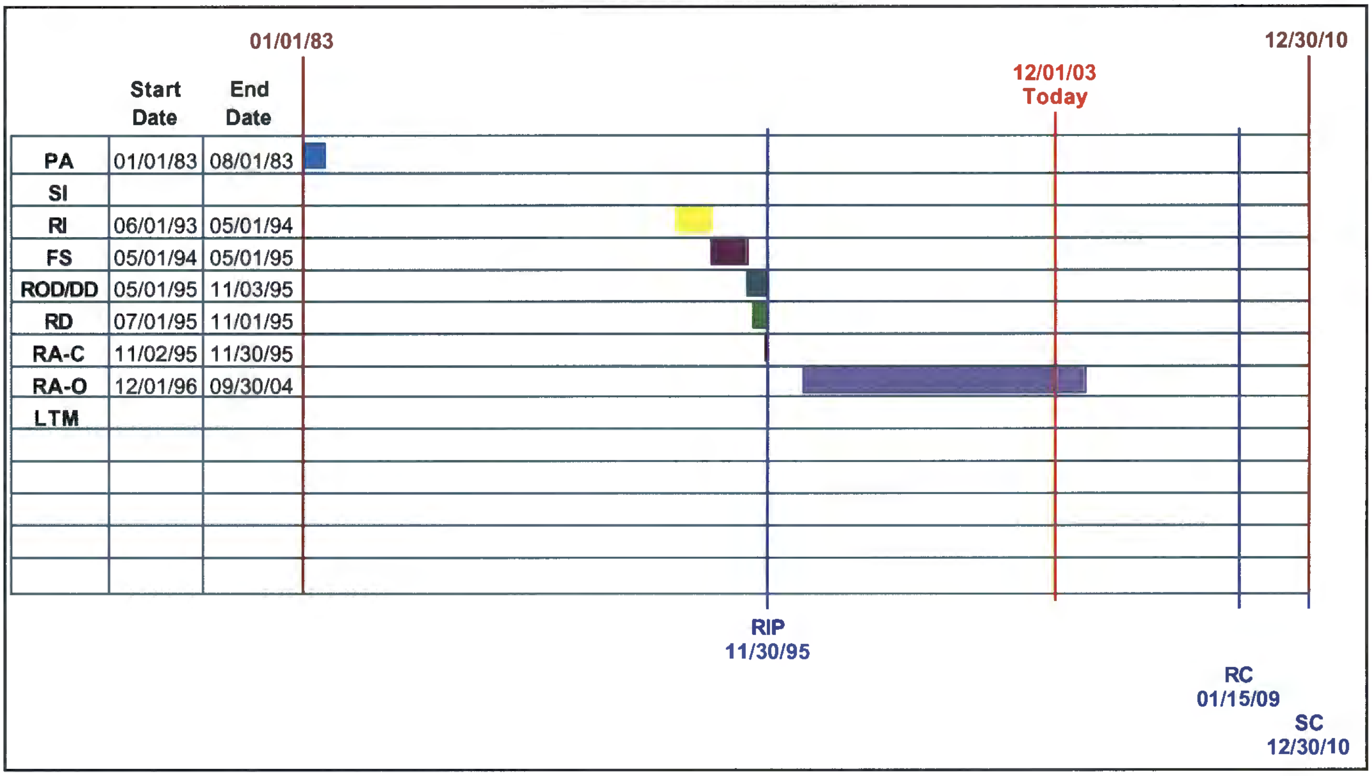
Remedy Type:

Remedy Type	Phase	Start Date	End Date
Soil vapor treatment	RA-C	11/02/95	11/30/95

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS057

Relative Risk: NR



	Start Date	End Date
PA	01/01/83	08/01/83
SI		
RI	06/01/93	05/01/94
FS	05/01/94	05/01/95
ROD/DD	05/01/95	11/03/95
RD	07/01/95	11/01/95
RA-C	11/02/95	11/30/95
RA-O	12/01/96	09/30/04
LTM		

LF058

Site Name: LANDFILL/INCINERATOR
Current site phase status: ROD/DD
Relative Risk: NR
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

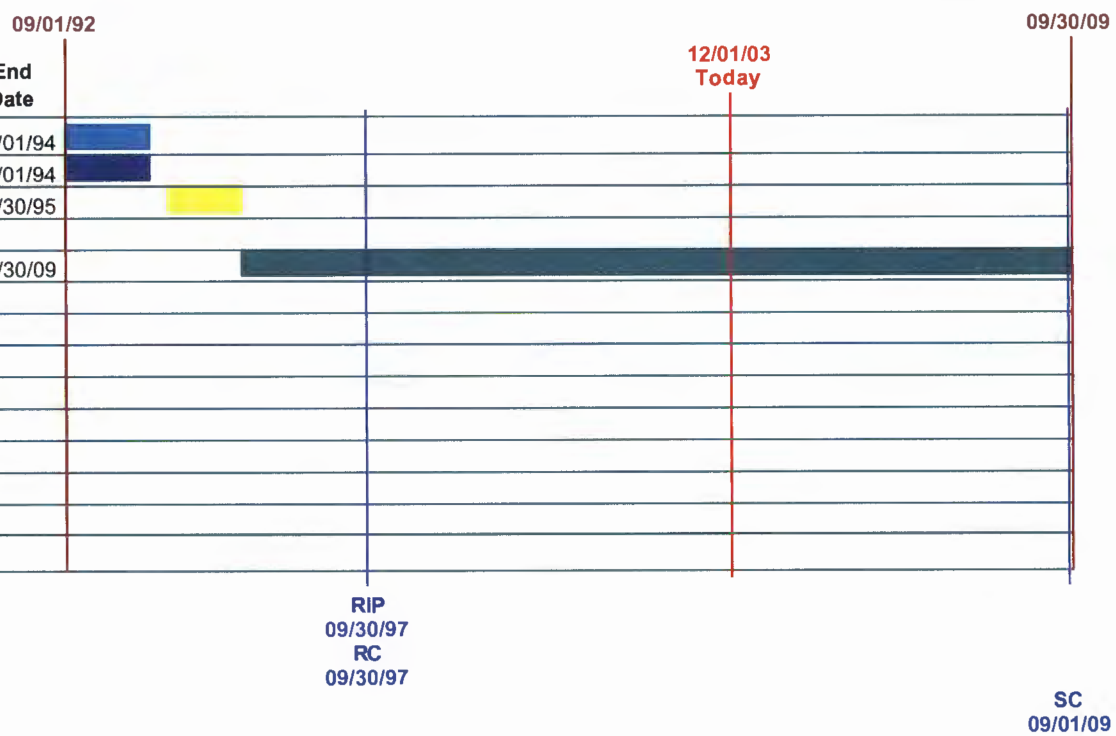
LF-58 LANDFILL

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** LF058

Relative Risk: NR

	Start Date	End Date
PA	09/01/92	02/01/94
SI	09/01/92	02/01/94
RI	06/01/94	08/30/95
FS		
ROD/DD	08/30/95	09/30/09
RD		
RA-C		
RA-O		
LTM		



SS059

Site Name:	T-38 TEST CELL	
Current site phase status:	LTM	
Relative Risk:	NR	
Prior year funding (FY03):		$0
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$0

Site description:

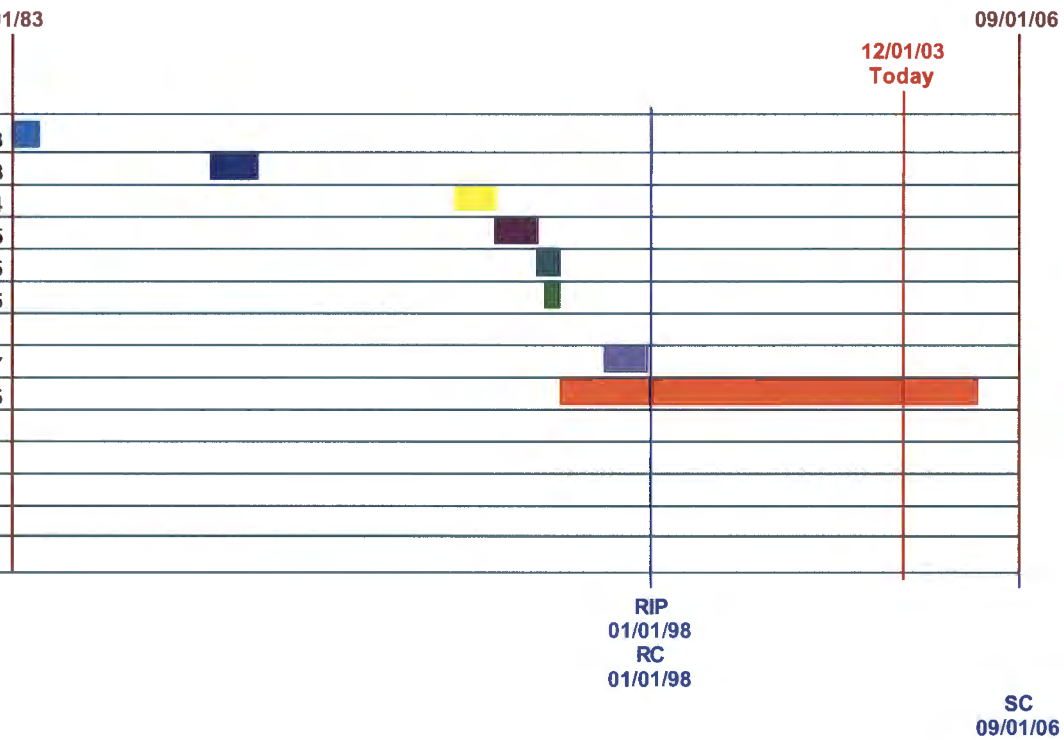
SS-59 T-38 TEST CELL

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS059

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	06/01/93	05/01/94
FS	05/01/94	05/01/95
ROD/DD	05/01/95	11/03/95
RD	07/01/95	11/01/95
RA-C		
RA-O	12/01/96	12/01/97
LTM	12/01/95	09/01/05



SS060

Site Name:	BLDG 828 FUEL SPILL SITE
Current site phase status:	NFRAP IV
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$0

Site description:

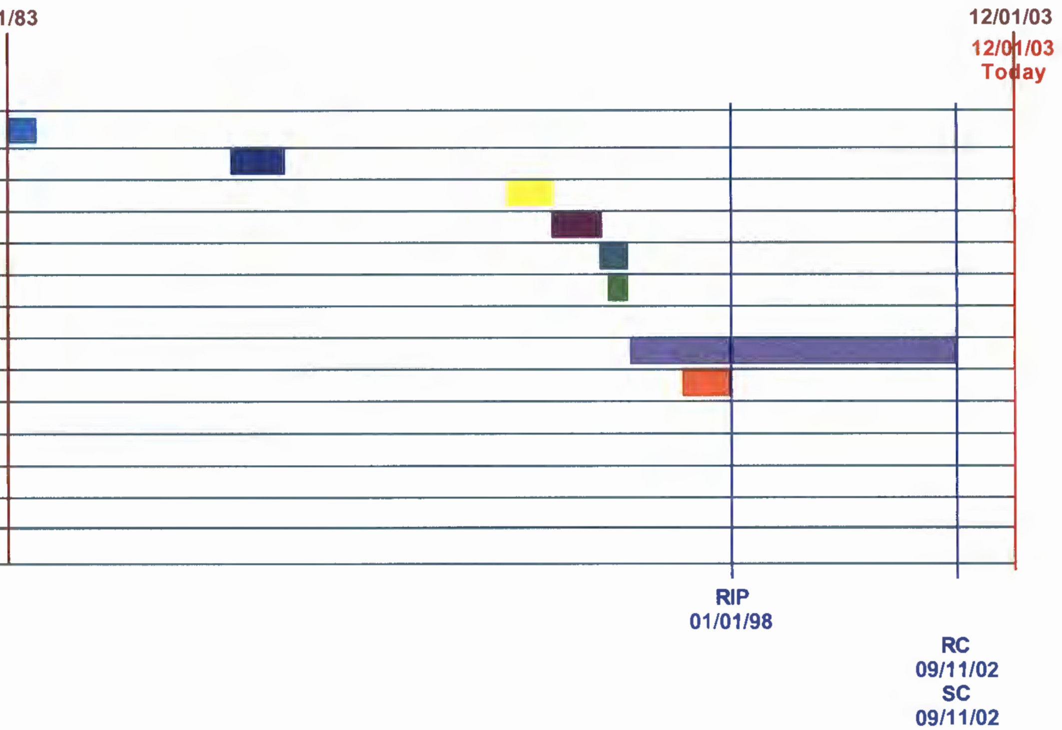
BLDG 828 FUEL SP

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS060

Relative Risk: NR

	Start Date	End Date
PA	01/01/83	08/01/83
SI	09/01/87	10/01/88
RI	06/01/93	05/01/94
FS	05/01/94	05/01/95
ROD/DD	05/01/95	11/03/95
RD	07/01/95	11/01/95
RA-C		
RA-O	12/01/95	09/11/02
LTM	12/30/96	12/30/97



SS061

Site Name: FUEL SPILL
Current site phase status: RI
Relative Risk: MED
Prior year funding (FY03): $213,487
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $111,500

Site description:

The site was discovered during a aerial photo investigation of a site located over one thousand feet to the northwest. The 1947 image shows fuel tanks and ground surface disturbances and discoloration at the site. This area was used to support B-25 aircraft during 1940's. Waste generated at the site included contaminated engine oil, PD-680, hydraulic fluid, and waste JP-4.

Soil and groundwater samples were retrieved and analyzed from boreholes. Benzene and 1,2 DCA were identified and considered the contaminants of concern.

The spread of contaminated water throughout the environment and eventually off base.

Contaminants of concern:

Media	Contaminant	Sample Result	Units
Ground water	1,2-Dichloroethane (EDC)	940	ug/L
Ground water	Benzene	11000	ug/L

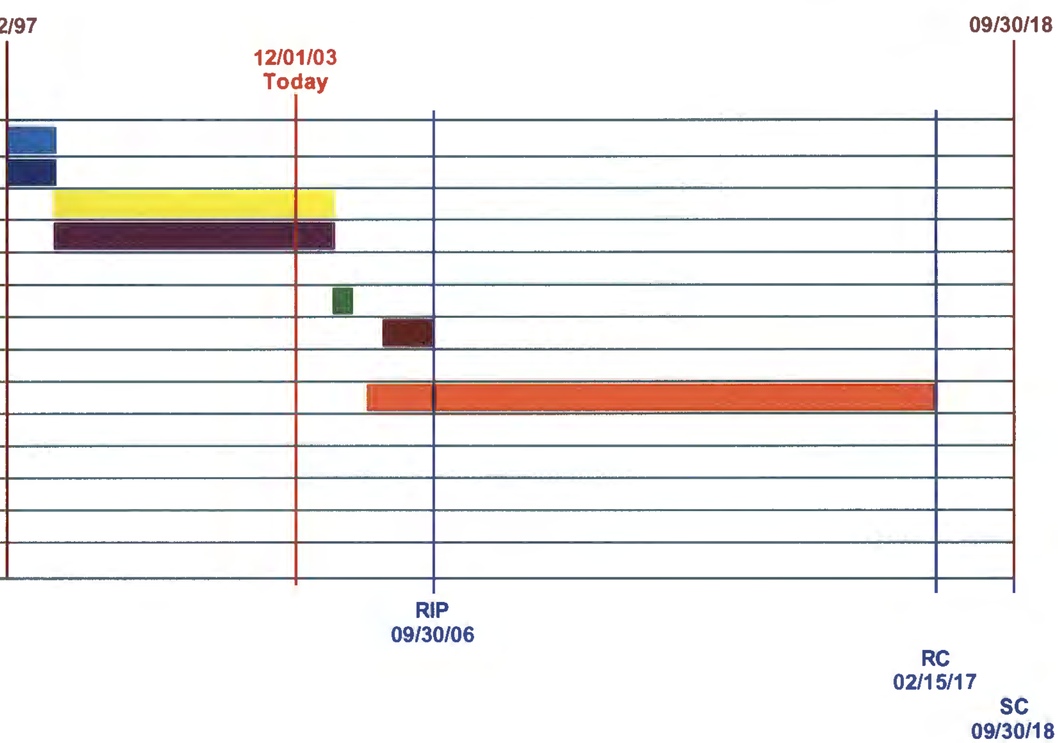
Remedy Type:

Remedy Type	Phase	Start Date	End Date
Waste removal - soils	RA-C	09/30/05	09/30/06

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** SS061
Relative Risk: MED

	Start Date	End Date
PA	12/22/97	12/22/98
SI	12/22/97	12/22/98
RI	12/15/98	09/19/04
FS	12/15/98	09/19/04
ROD/DD		
RD	09/19/04	01/23/05
RA-C	09/30/05	09/30/06
RA-O		
LTM	05/30/05	02/15/17



DP062

Site Name:	Ritas Draw	
Current site phase status:	RI	
Relative Risk:	MED	
Prior year funding (FY03):		$347,112
Current funding (FY04):		Displayed only for internal release
Future funding (FY05-Finish):		$111,500

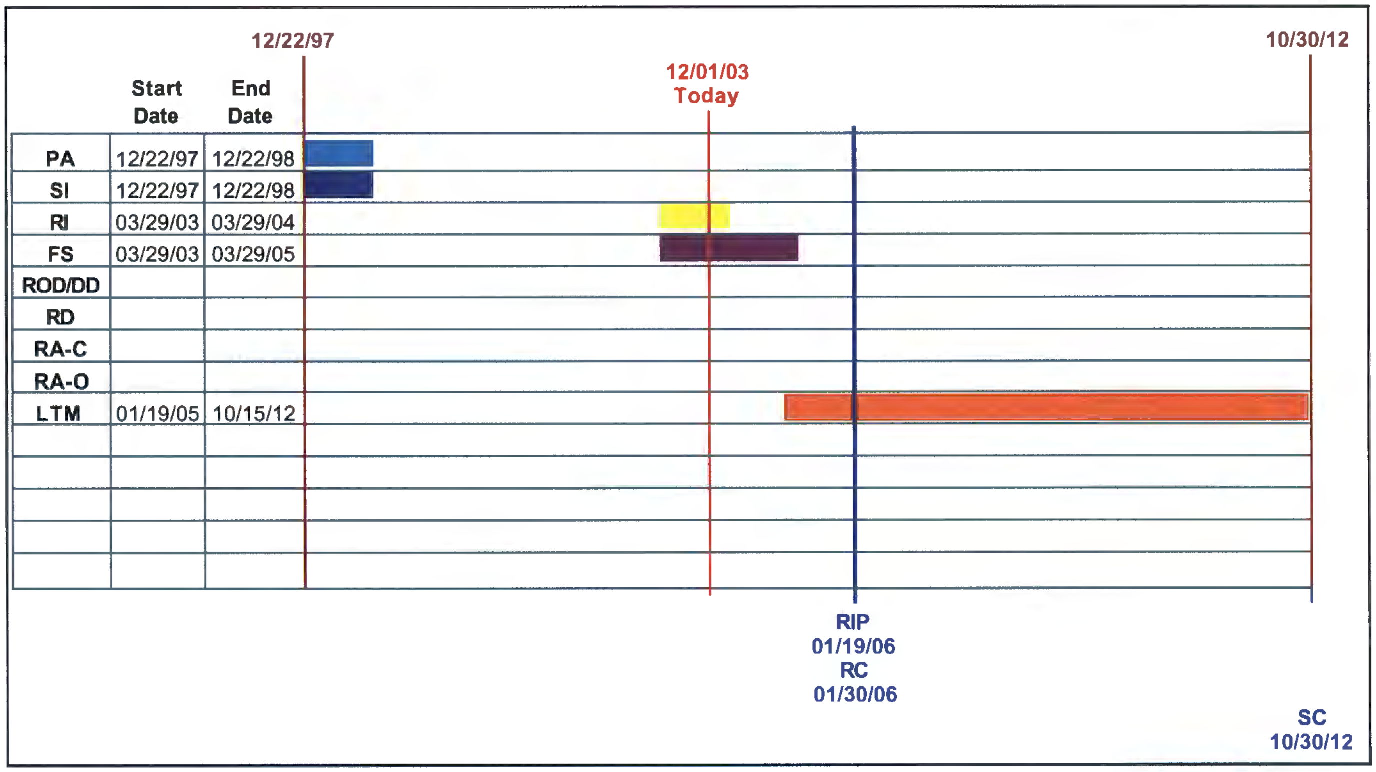
Site description:

Ritas Draw is located approximately 300 feet west of site OT-04, the Acid Trailer Burial Site

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** DP062

Relative Risk: MED



	Start Date	End Date
PA	12/22/97	12/22/98
SI	12/22/97	12/22/98
RI	03/29/03	03/29/04
FS	03/29/03	03/29/05
ROD/DD		
RD		
RA-C		
RA-O		
LTM	01/19/05	10/15/12

DP063

Site Name:	Ammunition Disposal Pit
Current site phase status:	Awaiting Action - RD
Relative Risk:	NR
Prior year funding (FY03):	$0
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$430,000

Site description:

Under pass operations munitions were placed into the pit with fuel and wood then ignited to render the ordnance inert.

Over time fuel may have seeped into the soils directly below the treatment area.

The Environmental Flight personnel performed a cursory visual inspection of the site during and found munitions residuals exposed on the ground surface throughout the area as a result of erosion.

Remedy Type:

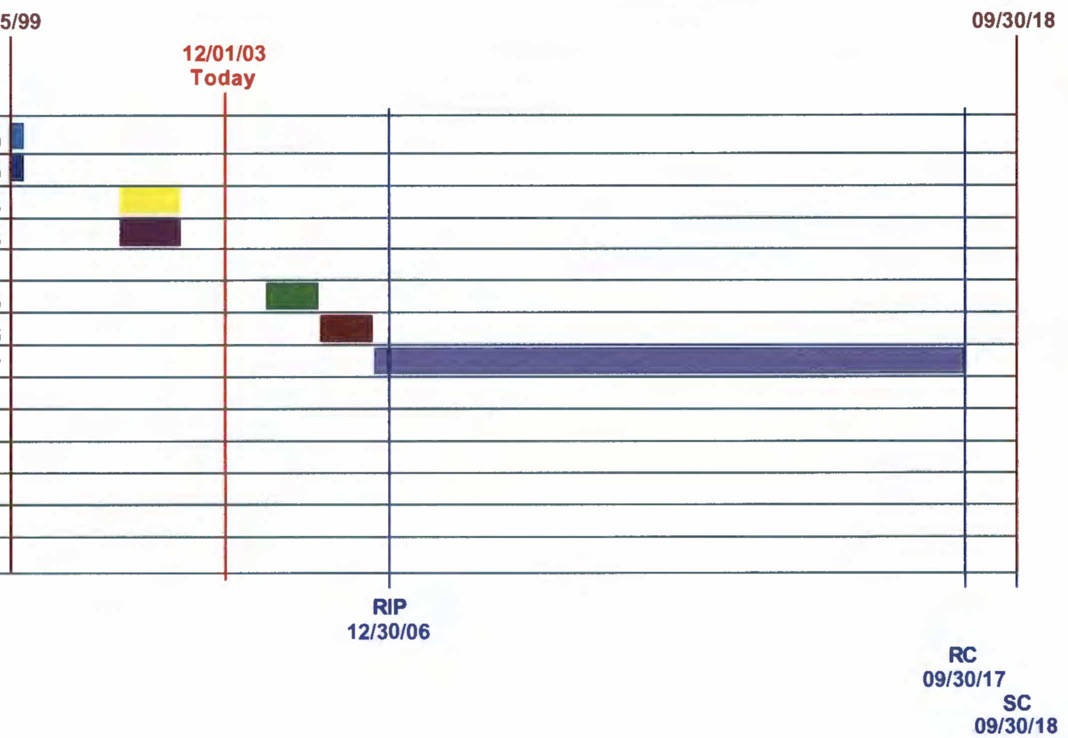
Remedy Type	Phase	Start Date	End Date
Removal	RA-C	09/30/05	08/30/06

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** DP063

Relative Risk: NR

	Start Date	End Date
PA	12/15/99	02/28/00
SI	12/15/99	02/28/00
RI	01/03/02	01/30/03
FS	01/03/02	01/30/03
ROD/DD		
RD	09/30/04	08/30/05
RA-C	09/30/05	08/30/06
RA-O	09/30/06	09/30/17
LTM		



DP064

Site Name: Chemical Agent Disposal Site
Current site phase status: Awaiting Action - RI
Relative Risk: High
Prior year funding (FY03): $0
Current funding (FY04): Displayed only for internal release
Future funding (FY05-Finish): $0

Site description:

Site is located on the eastern edge of base north of landfill 01 (LF-01) area. Two small ampoules containing a clear yellowish-brown liquid was found on the site.

Analysis confirmed lewisite and mustard agent in the intact ampoules. Broken ampoules found on the ground surface belonged to CAIS used for chemical warfare training in 1940's and 50's. Pathway - human contact.

Analysis confirmed lewisite and mustard agent in the intact ampoules. Broken ampoules found on the ground surface belonged to CAIS used for chemical warfare training in 1940's and 50's. Receptor - Human

Contaminants of concern:

Media	Contaminant	Sample Result	Units
Surface water	Lewisite	500	ug/L
Surface water	Sulfur Mustard	500	ug/L

Remedy Type:

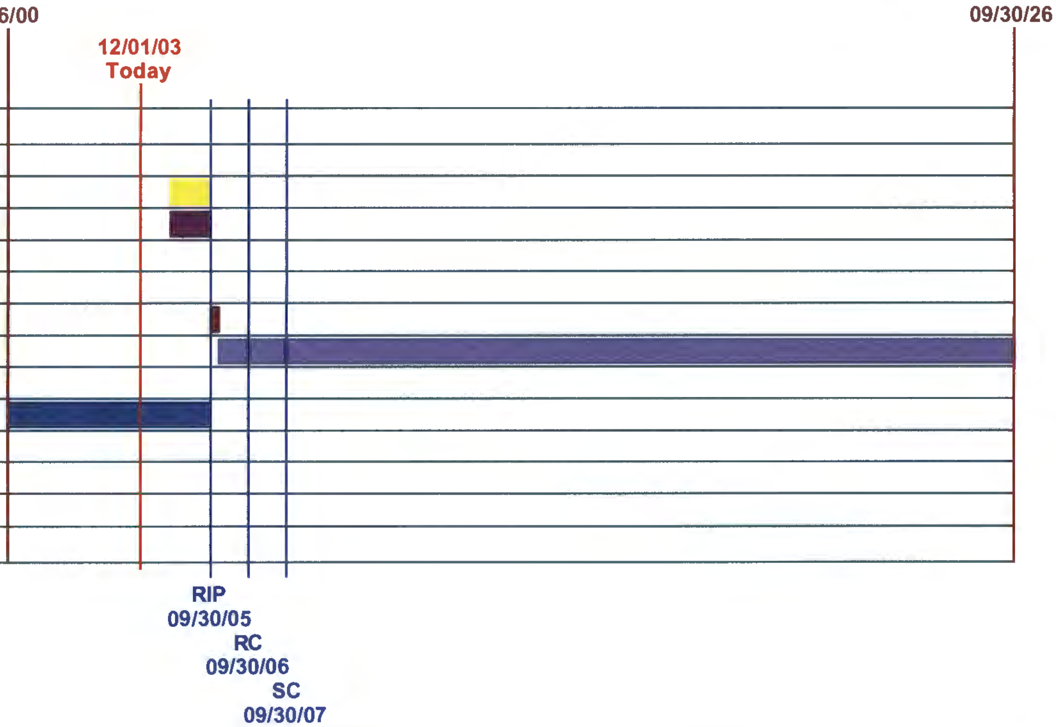
Remedy Type	Phase	Start Date	End Date
Chemical reduction/oxidation	IRA-C	07/06/00	09/30/05
Removal	RA-C	10/30/05	12/30/05

Site Phase Schedule

MAJCOM: ACC | **Installation:** HOLLOMAN | **Site ID:** DP064

Relative Risk: High

	Start Date	End Date
PA		
SI		
RI	09/30/04	09/30/05
FS	09/30/04	09/30/05
ROD/DD		
RD		
RA-C	10/30/05	12/30/05
RA-O	12/30/05	09/30/26
LTM		
IRA-C	07/06/00	09/30/05



AOC-2

Site Name:	Sewage Drainage Pit
Current site phase status:	PA
Relative Risk:	NE
Prior year funding (FY03):	$138,780
Current funding (FY04):	Displayed only for internal release
Future funding (FY05-Finish):	$110,000

Site description:

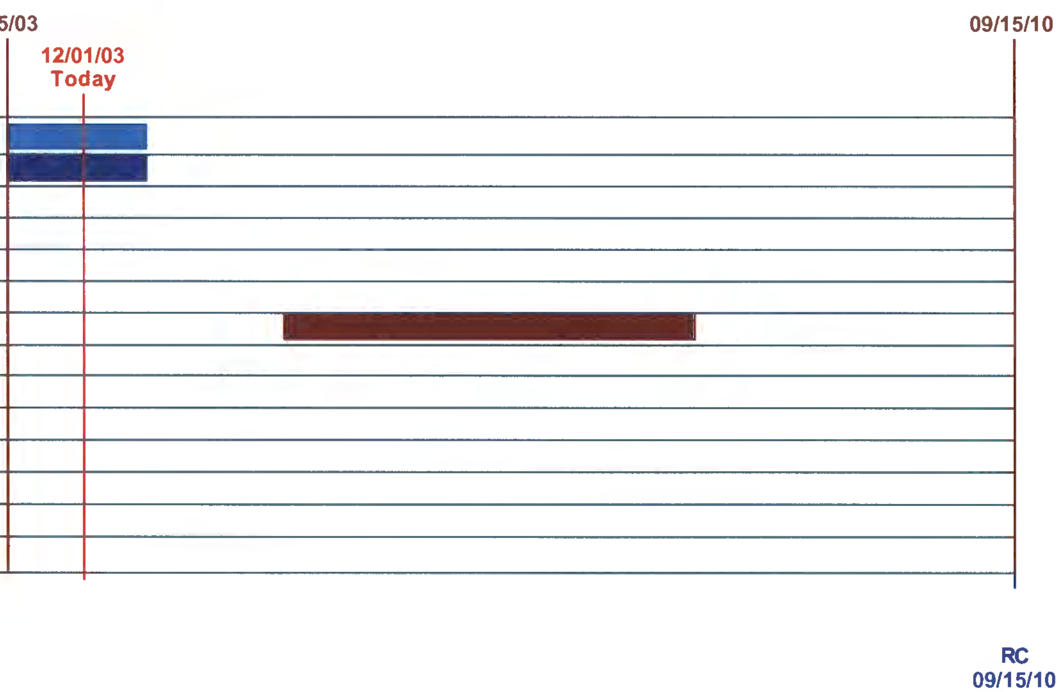
This area consists of a salt cedar grove surrounded by a wire fence and signage that reads "Sewage Disposal Area; Vehicle Traffic Prohibited".

Site Phase Schedule

MAJCOM: ACC **Installation:** HOLLOMAN **Site ID:** AOC-2

Relative Risk: NE

	Start Date	End Date
PA	05/15/03	05/15/04
SI	05/15/03	05/15/04
RI		
FS		
ROD/DD		
RD		
RA-AOC	05/17/05	05/17/08
RA-O		
LTM		



List of Acronyms and Abbreviations

ACRONYM	DEFINITION
ACC	Air Combat Command
ADW	11th Wing
AF	Air Force
AFA or USAFA	U.S. Air Force Academy
AFR	Air Force Reserves Command
AFRIMS	Air Force Restoration Information Management System
AMC	Air Mobility Command
ANG	Air National Guard
AOC	Area of Concern
AETC	Air Educational & Training Command
ARAR	Applicable or Relevant and Approprioate Requirement
BY	Budget Year
CEE or AFCEE	Air Force Center for Environmental Excellence
CERCLA	Comprehensive Environmental Restoration and Conservation Liability Act
CHF	Contaminant Hazard Factor
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study (CMS)
CTC	Cost to Complete
DD	Decision Document
DoD	Department of Defense
D&N	Discovery and Notification
EPA	Environmental Protection Agency
EPI	Environment Priorites Initiative
ERP	Environmental Restoration Program
EY	Execution Year
FY	Fiscal Year
FS	Feasibility Study (CMS Report)
GW	Ground Water
ICM	Inventory Control Management
ILE	HQ USAF/ILEVR
IRA-C	Interim Remedial Action-Cleanup/Removal Action
IRA-O	Interim Remedial Action-Operation
IRP	Installation Restoration Program
LTM	Long-Term Management
LTO	Long-Term Operation (replaced by the site phase RA-O)
MAP	Management Action Plan
MAJCOM or MAJ	Major Command
MGT	Management – Project Phase
MHQ	Management Headquarters – Project Phase
MOM	Measure of Merit
MPF	Migration Pathway Factor
MPR	Manpower - Project Phase
MPR-S	Manpower Site Costs – Project Phase
MTC or AFMC	Air Force Material Command
NE	Not Evaluated (Relative Risk)
NFA	No Further Action
NFRAP	No Further Response Action Planned
NR	Not Required (Relative Risk)
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit

OY	Out-Year
PA	Preliminary Assessment
PAF or PACAF	Pacific Air Force Command
PA/SI	Preliminary Assessment/Site Inspection
PCO-C	Project Closeout Cleanup
PCO-S	Project Closeout Study
POM	Program Objective Memorandum
PP	Proposed Plan
RA-C	Remedial Action
RA-AOC	Removal Action at an Area of Concern
RAB	Restoration Advisory Board
RA-C	Remedial Action Construction
RA-O	Remedial Action Operation
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Asscessment
RFI	RCRA Facility Investigation
RF	Receptor Factor
RI	Remedial Investigation (RFI Report)
RIP	Remedy in Place
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
ROD/DD	Record of Decision/Decision Document
RR	Relative Risk
SB	Statement of Basis
SC	Site Closeout or Site Complete
SED	Sediment
SI	Site Inspection
SOC or AFSOC	Air Force Special Operations Command
SPC or AFSPC	Air Force Space Command
SW	Surface Water
SWMU	Solid Waste Management Unit
TRC	Technical Review Committee
UST	Underground Storage Tank
UXO-RA	Unexploded Ordinance-Range Analysis, Cleanup, & Closeout
UXO-RI	Unexploded Ordinance-Range Identification

MANAGEMENT ACTION PLAN

Holloman AFB, NM (ACC)

Air Force Project No. ACCH20037544

December 2003

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APPENDICES

LIST OF FIGURES

ACRONYMS

ACC	Air Combat Command
ACL	Alternate concentration limits
ACP	Accelerated Cleanup Program
ADW	11th Wing
AETC	Air Educational & Training Command
AF	Air Force
AFA or USAFA	U.S. Air Force Academy
AFB	Air Force Base
AFR	Air Force Reserves Command
AFRIMS	Air Force Restoration Information Management System
AFSC	Air Force Systems Command
AGE	Aerospace ground equipment
AMC	Air Mobility Command
ANG	Air National Guard
ANSC	Area of no suspected contamination
AOC	Area of concern
ARARs	Applicable or relevant and appropriate requirements
ASCII	American Standard Code for Information Interchange
AVGAS	Aviation gasoline
BBMS	Bare Base Mobility Squadron
BCP	Base Comprehensive Plan
BGL	Below ground level
BRAC	Base Realignment and Closure Agency
BTEX	Benzene, toluene, ethylbenzene, and xylenes
BX	Base Exchange
BY	Budget Year
CEE or AFCEE	Air Force Center for Environmental Excellence
CERCLA	Comprehensive Environmental Restoration and Conservation Liability Act
CEVR	Civil Engineering Environmental Restoration
CHF	Contaminant Hazard Factor
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CNFA	Conditional No Further Action
COPC	Contaminant of Potential Concern

ACRONYMS (Continued)

CORA	Cost of Remedial Action
CRP	Community relations plan
CSM	Conceptual Site Model
CTC	Cost to Complete
CY	Cubic Yards
D&N	Discovery and Notification
DD	Decision Document
DOD	Department of Defense
DPM	Defense Priority Model
DPSVE	Dual-Phase Soil Vapor Extraction
DRMO	Defense Reutilization and Marketing Office
DSMOA	Defense and State Memorandum of Agreement
ECD	Electron Capture Detector
EOD	Explosive Ordnance Division
EPA	U.S. Environmental Protection Agency
EPI	Environment Priorites Initiative
ERA	Environmental Restoration Account
ERP	Environmental Restoration Program (Formerly IRP)
ERPIMS	Environmental Resources Program Information Management System
EY	Execution Year
FAA	Federal Aviation Administration
FFA	Federal Facilities Agreement
FFCA	Federal Facilities Compliance Agreement
FPD	Flame Photometric Detector
FPTA	Fire Protection Training Area
FS	Feasibility study
ft	Foot or feet
FY	Fiscal Year
GC/MS	Gas Chromatography/Mass Spectrometry
GFAA	Graphite Furnace Atomic Absorption
GIS	Geographical Information System
GW	Ground Water
HARM	Hazard Assessment Rating Methodology
HDPE	High-Density Polyethylene
HML	Hazardous Materials Laboratory
HQACC	Headquarters Air Combat Command

ACRONYMS (Continued)

HSWA	Hazardous and Solid Waste Amendments
HTH	High-Test Hypochlorite
HWMU	Hazardous waste management unit
IC	Ion Chromatography
ICM	Inventory Control Management
ICPES	Inductively Coupled Plasma Emission Spectroscopy
ILE	HQ USAF/ILEVR
IM	Information Measure
IO&P	Indirect Overhead and Profit
IPMS	Independent Performance Management System
IR	Infrared Spectrometry
IRA	Interim remedial action
IRA-C	Interim Remedial Action-Cleanup/Removal Action
IRA-O	Interim Remedial Action-Operation
IRFNA	Inhibited Red Fuming Nitric Acid
IRP	Installation Restoration Program
IWFNA	Inhibited white fuming nitric acid
JPX	1:1 JP-4 and UDMH
LNAPL	Light Nonaqueous Phase Liquid
LOX	Liquid oxygen
LTM	Long-Term Management
LTM	Long-term monitoring
LTO	Long-term operation
MAJCOM or MAJ	Major Command
MAP	Management Action Plan
MCL	Maximum Contaminant Level
MEIL	Methyl Ethylketone
MEK	Methyl Ethyl Ketone
mg/kg	Milligrams per kilogram
mg/l	Milligrams per liter
MGD	Million gallons per day
MGT	Management – Project Phase
MHQ	Management Headquarters – Project Phase
MIBK	Methylisobutyl Ketone
MOGAS	Motor gasoline
MOM	Measure of Merit

ACRONYMS (Continued)

MPF	Migration Pathway Factor
MPR	Manpower - Project Phase
MPR-S	Manpower Site Costs – Project Phase
MTC or AFMC	Air Force Material Command
NA	Not Applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NE	Not Evaluated (Relative Risk)
NEPA	National Environmental Policy Act
NFA	No Further Action
NFRAP	No Further Response Action Planned
NMED	New Mexico Environment Department
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NR	Not Required (Relative Risk)
O&M	Operation and Maintenance
O/WS	Oil/Water Separator
OCP	Organochlorine Pesticides
OPP	Organophosphorous Pesticides
OSWER	Office of Solid Waste and Emergency Response
OUs	Operable Units
OY	Out-Year
PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Inspection
PAF or PACAF	Pacific Air Force Command
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethylene
PCO-C	Project Closeout Cleanup
PCO-S	Project Closeout Study
PDI	Pre-Design Investigation
POL	Petroleum, Oil, and Lubricants
POM	Program Objective Memorandum
PP	Proposed Plan
PPE	Pathways, Parameters, and Equations
ppm	Parts Per Million
PRI	Post RCRA Investigation

ACRONYMS (Continued)

PRL	Primate Research Laboratory
QA	Quality Assurance
QC	Quality Control
QVE	Quality Value Engineering
RA	Remedial Action
RA-AOC	Removal Action at an Area of Concern
RAB	Restoration Advisory Board
RA	Remedial Action
RA-C	Remedial Action – Construction
RA-O	Remedial Action - Operations
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDBMS	Relational Database Management System
RF	Receptor Factor
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIP	Remedy in Place
RNSI	Rational National Standards Initiative
ROD/DD	Record of Decision/Decision Document
RPM	Remedial Project Manager
RR	Relative Risk
SB	Statement of Bias
SC	Site Closed
SC	Site Closeout
SED	Sediment
SI	Site Inspection
SI	Site Investigation
SOB	Statement of Basis
SOC or AFSOC	Air Force Special Operations Command
SPC or AFSPC	Air Force Space Command
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compounds
SW	Surface Water

ACRONYMS (Continued)

SWMU	Solid Waste Management Unit
TAC	Tactical Air Command
TAL	Target Analyte List
TCA	Trichloroethane
TCE	Trichloroethylene or Trichloroethene
TERC	Total Environmental Restoration Contract
TM	Technical Manager
TOX	Total Organic Halogens
TPH	Total Petroleum Hydrocarbons
TPM	Technical Project Manager
TRC	Technical Review Committee
TRPH	Total Recoverable Petroleum Hydrocarbons
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal
UDMH	Unsymmetrical Dimethylhydrazine
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
UXO-RA	Unexploded Ordinance-Range Analysis, Cleanup, & Closeout
UXO-RI	Unexploded Ordinance-Range Identification
VCA	Voluntary Corrective Action
VOC	Volatile Organic Compound
WAA	Waste Accumulation Area
WIMS-ES	Work Information Management System - Environmental Subsystem
WOT	Waste Oil Tank

EXECUTIVE SUMMARY

Introduction

This Supplemental Installation Environmental Restoration Program (ERP) Management Action Plan (MAP) summarizes the status of the installation's ERP and identifies specific program issues to promote effective investigation and cleanup strategies. The focus of the MAP is to get cleanup remedies in place (RIP) and to attain response complete (RC) as early as possible. Meeting RIP/RC schedules will insure a corresponding reduction in risk. Consequently, the MAP provides a complete historical background of the sites and presents a comprehensive strategy for funding and implementing response actions necessary to protect human health and the environment.

Formal updates to this Supplemental Installation MAP are published annually using data from the installation's Restoration Project Manager (RPM), Command Program Manager, data from the Air Force Restoration Information Management System (AFRIMS), contractors, and Service Center. An AFRIMS MAP is submitted annually to Air Staff or can be downloaded at the discretion of the Air Force and its MAJCOMS throughout the year. The AFRIMS MAP can be provided in two versions; an internal version containing complete AFRIMS information or the public version without current year or Cost-to-Complete (CTC) information. The project information provided does not necessarily represent those that have been or will be approved by the Air Force or state and federal regulatory agencies. Project information is made based on the best available information at the time of printing and may vary dramatically over time as a result of changes in plans and cleanup decisions.

Holloman Air Force Base (AFB) plans and executes environmental response actions under the ERP to identify and remediate contamination from past installation operations. The Air Force ERP addresses contamination caused by releases of hazardous substances or petroleum products that occurred prior to January 1984. The program is managed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA) and the Resource Conservation and Recovery Act, as amended (RCRA).

Restoration Program

The ERP at Holloman AFB began on May 1983 with a base-wide Records Search that identified 43 ERP sites for further investigation. Supplemental investigations in the late 1980s and early 1990s have brought the total number of ERP sites to 64. Eight Areas of Concern (AOCs) and 106 Solid Waste Management Units (SWMU) have been identified and are listed in the RCRA Part B Permit issued by the New Mexico Environmental Department (NMED). Most of the SMWUs and AOCs are ERP sites, and are therefore being investigated and cleaned up under the ERP (some ERP sites are composed of one or more SWMUs or AOCs).

There are 64 ERP sites associated with Holloman AFB, 60 of which are located on the main Base. Three remote sites are located in southern New Mexico, and one remote site is located in extreme west Texas. Of the 64 ERP sites, 36 are site closed with no further response action planned (NFRAP), 9 are site closed with RA-O, and 15 are closed with long-term monitoring (LTM). Three sites are in the preliminary assessment/ site investigation (PA/SI) stage or

Remedial Investigation (RI) stage, and one site is in Remedial Design (RD). The 64 ERP sites include storage tanks, landfills, drainage areas, fire training areas, spill areas, radioactive waste sites, and waste disposal pits. Primary contaminants in soil and water include fuels, waste solvents, pesticides/herbicides, and low-level radiation waste.

Past and Future Costs

Funds Invested to Date are available from the AFRIMS database and/or the AFRIMS MAP. Holloman AFB has completed investigations at all 64 of its sites and has executed or initiated remediation activities as required. Thirty-six of the sites are now closed with NFRAP , and 15 are closed with LTM. In addition, remedial action operations (RA-O) are ongoing at 9 sites, and investigations and remedial designs (RDs) continue at another 4 sites. **Funds Required to Complete,** also known as Cost-to-Complete (CTC), represent those funds needed to complete all future ERP activities at Holloman AFB. The funds invested and the funds required for each fiscal year are summarized in AFRIMS. These expenditures cover focused investigations, source excavation and treatment, underground fuel removal and treatment, groundwater extraction and treatment, long-term monitoring, and enforcement of institutional controls through the year 2028.

ERP Schedule Summary

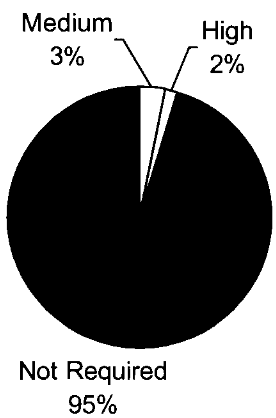
Focused investigations at the Base will continue through FY 2006. Remedial design activity at sites requiring action will continue through FY 2006. All removal and remedial actions are expected to be in place at several sites by the end of FY 2006. Monitoring and long-term operations are expected to continue at selected sites through FY2028 or until remediation goals have been achieved.

Relative Risk Reduction

A relative risk site evaluation is a process used by DOD to categorize sites for funding based on the sites' relative risk. Holloman's anticipated relative risk reduction, a key measure of merit (MOM) for the Air Force ERP, is summarized in Figure ES-1. The current relative risk profile at Holloman AFB sites is as follows: 2 medium (M), 1 high (H) and 61 not required (NR). Relative risk reduction at high sites will be accomplished by 2005 and all 64 sites are expected to be in remedy in place (RIP) status by 2006.

FIGURE ES-1
Holloman AFB Current Relative Risk

Site ID	Risk	Site ID	Risk
LF001	NR	SD033	NR
SS002	NR	OT034	NR
OT003	NR	OT035	NR
OT004	NR	SS036	NR
SS005	NR	OT037	NR
SS006	NR	OT038	NR
LF007	NR	SS039	NR
SD008	NR	LF040	NR
SS009	NR	OT041	NR
LF010	NR	RW042	NR
OT011	NR	DP043	NR
SS012	NR	OT044	NR
SS013	NR	OT045	NR
OT014	NR	SS046	NR
SD015	NR	SD047	NR
OT016	NR	SS048	NR
SS017	NR	WP049	NR
SS018	NR	WP050	NR
LF019	NR	RW051	NR
OT020	NR	OT052	NR
LF021	NR	OT053	NR
LF022	NR	OT054	NR
LF023	NR	OT055	NR
OT024	NR	SS056	NR
SD025	NR	SS057	NR
SS026	NR	LF058	NR
SD027	NR	SS059	NR
SD028	NR	SS060	NR
LF029	NR	SS061	M
DP030	NR	DP062	M
FT031	NR	DP063	NR
OT032	NR	DP064	H



Project Status

The current and projected phase status of ERP sites at Holloman AFB is a performance metric and a key MOM for sites included in the ERP. For the current fiscal year, 3 sites are in the investigation phase, 10 are in the cleanup phase (i.e., undergoing an interim remedial action or remedial action construction or operation), and 51 are response complete.

There is only one site, categorized as in the investigation phase, which requires additional study in the current fiscal year. Actual cleanup actions at sites are expected to continue through 2006, and LTM through 2028 or until remediation goals are met.

1. INTRODUCTION

As a result of past waste and resource management practices at Holloman Air Force Base (AFB) (also referred to as the Base), some areas have become contaminated by various toxic and/or hazardous compounds. In response, an environmental clean-up program (which is referred to within the Air Force as the Environmental Restoration Program (ERP)) has been initiated at the Base. In addition, ongoing efforts to comply with applicable laws and regulations ensure that present waste and resource management practices are carried out in a manner that protects human health and the environment.

This Management Action Plan (MAP) summarizes the current status of the Holloman AFB environmental restoration program and presents a comprehensive strategy for implementing response actions necessary to protect human health and the environment. This strategy integrates activities being performed under the ERP to support restoration of the Base. In particular, the solid waste management units (SWMUs) investigated under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program are discussed and evaluated in detail. This information is compiled in this format to make it accessible to the public and Base personnel. The MAP is a dynamic document that will be updated regularly to incorporate newly obtained information to reflect the completion or change in status of any remedial actions (RAs). Site-specific information is located in Appendix C1. This MAP was prepared with information available as of December 2003.

This MAP is a planning document. Information presented does not necessarily represent what has been or will be approved by the USAF or state and federal regulatory agencies. As additional data becomes available, actual strategies could be dramatically different. Any changes would then be reflected in future updates to the MAP.

Chapter 1 describes the objectives of the environmental restoration program, explains the purpose of the MAP, introduces the current project team that manages the program, and provides a brief history of the Base.

Chapter 2 summarizes the current environmental restoration program strategy, status and past history of the Holloman AFB ERP, RCRA Corrective Action Program, other associated environmental compliance programs, and community relations activities that have occurred to date.

Appendix A provides tables of ERP deliverables, AR/IR references, and ERPIMS status.

Appendix B provides tables listing Decision Documents for Remedial Alternative Selection and No Further Response Action Planned (NFRAP) summaries.

Appendix C is subdivided to provide detailed Site Descriptions (C1), Active Project Summaries (C2), and ERP Site Maps (C3).

Appendix D is subdivided to provide information specific to the Base, including land use, compliance program information, and Holloman's Strategic Plan.

1.1 ENVIRONMENTAL RESPONSE OBJECTIVES

The objectives of the Holloman AFB environmental restoration program are to:

- Protect human health and the environment;
- Comply with existing statutes and regulations;
- Meet Federal Facilities Compliance Agreement (FFCA) schedules and/or commitments in other agreements that may be introduced later;
- Complete remedial investigations (RIs) as soon as practicable for each ERP site;
- Identify all potential source areas;
- Initiate removal actions where necessary to control, eliminate, or reduce risks to manageable levels;
- Characterize risks associated with releases of hazardous substances, pollutants, contaminants, or hazardous wastes;
- Develop, screen, and select RAs that reduce risks in a manner consistent with statutory requirements;
- Implement RAs specified in the decision documents (DDs) for the sites addressed under the ERP;
- Implement the Accelerated Cleanup Program (ACP); and
- Implement and maintain the Base-wide long-term monitoring (LTM) program to ensure the future reliability of all removals for RAs implemented under the ERP.

1.2 MAP PURPOSE, UPDATES, AND DISTRIBUTION

The purpose of this MAP is to summarize the status of Holloman AFB's environmental restoration program and provide a comprehensive long-range strategy for conducting both the environmental restoration and associated compliance programs. In addition, it defines the status of efforts to resolve scientific and technical issues so that continued progress and implementation of scheduled activities can occur. The Holloman AFB project team will use this MAP to plan, direct, and monitor environmental response actions and to schedule activities needed to resolve technical, administrative, and operational issues.

1.3 PROJECT TEAM AND RESTORATION ADVISORY BOARD

The Holloman AFB project team has been established and is led by the Base Remedial Project Manager (RPM). The project team meets or communicates regularly to resolve technical and policy issues, to conduct program reviews, and to reach consensus on procedural, organizational, and operational issues. Table 1-1 lists the team members and specifies their roles and responsibilities.

TABLE 1-1 CURRENT HOLLOMAN AFB PROJECT TEAM MEMBERS

Management Action Plan
Holloman AFB, New Mexico

CORE TEAM MEMBERS			
Name	**Title**	**Telephone/Fax**	**Role/Responsibility**
Daniel Holmquist	Project Manager	(505) 572-5395/ (505) 572-7015	Remedial Project Manager/ Holloman AFB
David Scruggs	Restoration Chief	(505) 572-5395/ (505) 572-7015	Remedial Project Manager/ Holloman AFB
Allen Chang	Project Manager	(214) 655-7442/ (214) 655-6660	Project Manager/EPA Region VI
Julie Jacobs	Project Manager	(505) 428-2554/ (505) 827-2965	Project Manager/ NMED CERCLA DSMOA
Cornelius Amindyas	Project Manager	(505) 841-9488/ (505) 884-9254	Project Manager/NMED RCRA DSMOA, Hazardous Waste Bureau
George Fish	Project Manager	(505) 479-6095/ (505) 479-4297	Project Manager/USACE-Albuquerque
Jim Haggins	Project Manager	(757) 764-4420/ (757) 764-9369	Project Manager/HQACC CEVR
Tom Zink	Project Manager	(402) 221-7666/ (402) 221-7838	Project Manager/USACE-Omaha
Frank Gardner	Program Manager	(970) 216-7819	Bhate Environmental
James Morning	Site Manager	(505) 679-2100/ (505) 679-2148	Site Manager/Foster Wheeler Environmental Corporation

Notes:
AFB = Air Force Base
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
DSMOA = Defense and State Memorandum of Agreement
EPA = U.S. Environmental Protection Agency
HQACC = Headquarters Air Combat Command
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act
TERC = Total Environmental Restoration Contract
USACE = U.S. Army Corps of Engineers

The Restoration Advisory Board (RAB) has been established to provide a forum for public participation in environmental restoration issues on the Base with the following goals:

- Obtaining community review and comment on technical documents relating to environmental studies at the Base;
- Obtaining community review and comment on restoration activities at the Base;
- Providing a mechanism to accelerate the ERP program;
- Keeping the public informed about environmental restoration issues on the Base through public RAB meetings;
- Providing a forum for community comment; and
- Holding biannual meetings.

Table 1-2 lists the active board members.

TABLE 1-2 RESTORATION ADVISORY BOARD

Management Action Plan

Holloman AFB, New Mexico

Name	Role/Organization	Phone
Don Carroll	Co-Chair/Mayor of Alamogordo	(505) 439-4502
Col. John M. Neil	Co-Chair/49 FW/CV	(505) 572-5571
Daniel Holmquist	Remedial Project Manager/Recorder	(505) 572-5395
David Scruggs	Remedial Project Manager/Recorder	(505) 572-5395

Notes:
ERP = Environmental Restoration Program
RAB = Restoration Advisory Board

1.4 BRIEF HISTORY OF INSTALLATION AND LAND USE

Holloman AFB is located in south-central New Mexico, about 75 miles north-northwest of El Paso, Texas (see Figure 1-1). The Base covers approximately 59,827 acres. Highway 70, which runs in a southwesterly-northeasterly direction, provides most of the southern boundary; the other sides of the Base are bordered by open land (see Figure 1-2). The Base is located in the Tularosa Basin, which is bounded by the San Andres Mountains to the west and the Sacramento Mountains to the east. The Basin's interior plain has low relief, with altitudes ranging from approximately 4,000 feet in the southwest to approximately 4,400 feet in the northeast. The surrounding mountains rise to altitudes of 7,000 to 12,000 feet.

The climate in the Tularosa Basin is arid, with low annual rainfall and low relative humidity. Mean annual precipitation is 7.9 inches, mostly from thunderstorm activity from May through October. The mean annual lake evaporation rate is approximately 67 inches.

The Tularosa Basin is a bolson, or a basin that has no surface drainage outlet. The bolson fill in the Tularosa Basin is derived from the erosion of limestone, dolomite, and gypsum in the surrounding mountains. Groundwater occurs in unconfined conditions in the unconsolidated bolson deposits beneath the Base and is designated as unfit for human consumption because it exceeds New Mexico human health standards for total dissolved solids and sulfate.

The buildings in the main Base area are shown in Figure 1-3. Holloman AFB is surrounded by undeveloped rangeland. The nearest residential and commercial area is the City of Alamogordo, which is located 7 miles east of the Base. Several off-base (satellite) installations are also operated by Holloman AFB (see Figure 1-4) including:

- Silver City Radar Site (deactivated late 1980s)
- El Paso Radar Site (deactivated late 1980s)
- Boles and San Andres Well Field Area
- Bonito Lake

Figure 1-5 is the present land use map of the Base. Figure 1-5a is a present land use map of the main Base area.

Holloman AFB, formerly Alamogordo Army Airfield, was initiated as a temporary facility during World War II, with construction commencing on 6 February 1942. Its status, mission, and Command have periodically changed over the years. Today, Holloman is under the Air Combat Command (ACC). The history of Base operations is summarized in Table 1-3.

Table 1-4 provides a summary of the key regulatory actions impacting Holloman AFB. The Base is not on the National Priorities List (NPL). A Phase I records search was conducted in August 1983. At this time, the 64 ERP sites at Holloman AFB are in various stages of the ERP process, with 51 sites designated as site closed (SC) or site closed with long-term monitoring (LTM). Decision Documents for a portion of the closed sites are pending.

1.5 KEY REGULATORY ENVIRONMENTAL ACTIONS

Key regulatory environmental actions are outlined in Table 1-4.

TABLE 1-3 HISTORY OF INSTALLATION OPERATIONS FOR HOLLOMAN AFB

Management Action Plan

Holloman AFB, New Mexico

Period	Types of Operations	Weapon System	Hazardous Substance Activities
Pre-1942	Rangeland	N/A	None
1942-1945	Alamogordo Army Airfield		Unknown
1945-1947	Inactive		None
1947-1951	Air Material Command		Testing pilotless aircraft, guided missiles, and allied equipment Petroleum, oil, and lubricants (POL), solvents, and protective coatings
1951-1952	Air Force Missile Test Center		Testing pilotless aircraft, guided missiles, and allied equipment POL, solvents, and protective coatings
1952-1957	Holloman Air Development Center		Testing pilotless aircraft, guided missiles, and allied equipment POL, solvents, and protective coatings
1957-1971	Air Force Missile Development Center		Testing pilotless aircraft, guided missiles, and allied equipment POL, solvents, and protective coatings
1971-1992	Tactical Air Command		49th Tactical Fighter Wing, 479th Tactical Training Wing, 833rd Air Division, and 4449th Mobile Support Squadron POL, solvents, protective coatings, and radionuclides
1992-Present	Air Combat Command		49th Tactical Fighter Wing, POL, solvents, protective coatings, and radionuclides

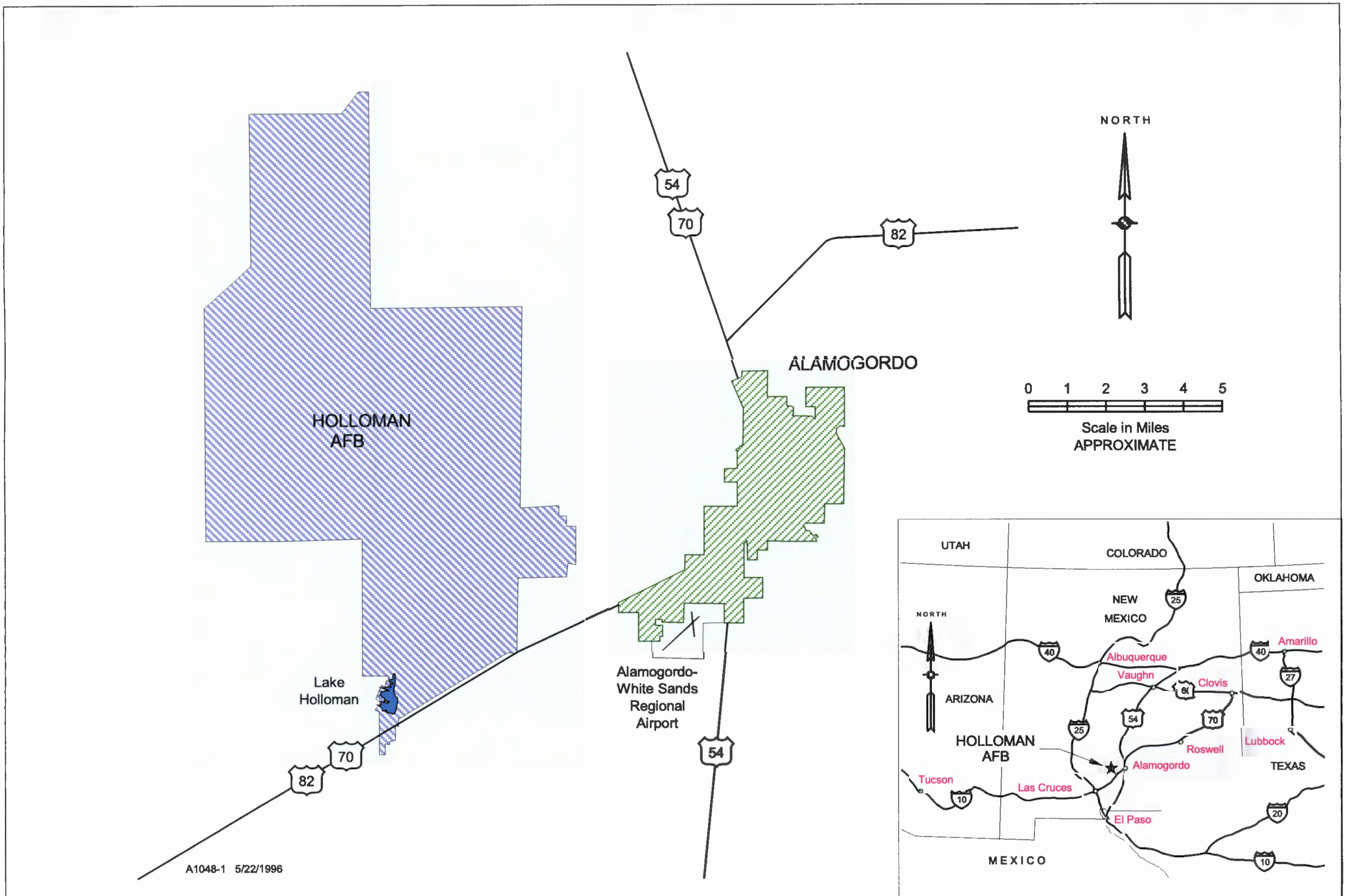
Notes:
AFB = Air Force Base
POL =Petroleum, Oil, and Lubricants

TABLE 1-4 KEY REGULATORY ACTIONS IMPACTING HOLLOMAN AFB

Management Action Plan
Holloman AFB, New Mexico

Date	Action	Details
23 August 1985	NOV	NOV for sewage lagoons WP-49
4 February 1987	NOV	NOV for sewage lagoons WP-49
September 1988	RFA completed	RCRA Facility assessment completed and all identified SWMUs at Holloman AFB
20 December 1988	FFCA	FFCA signed between Air Force and New Mexico Environmental Dept. (NMED)
5 April 1989	Quarterly Progress Report	First Quarterly Progress Report issued
7 June 1991	Post Closure Care Permit Application	Post Closure Care Permit Application for sewage lagoons submitted to NMED and EPA
July 1991	Table 1 SWMU completed	Table 1 SWMUs work plan was completed
22 August 1991	RCRA Part B permit obtained	RCRA Part B permit obtained
September 1991	HAFB required to commence with CAP	HAFB required to commence with corrective action plan required in the Hazardous and Solid Waste Amendments (HSWA) of their RCRA permit.
June 1992	Table 1 RFI completed	Table 1 RCRA Facility Investigation (RFI) report was completed
March 1993	Table 2 SWMUs completed	Table 2 SWMUs work plan was completed
July 1993	Permit Modification	Permit Modification request was completed (HSWA Tables)
April 1994	Table 3 SWMUs	Table 3 SWMUs work plan was completed
1995	Table 2 SWMUs RFI	Table 2 SWMUs RFI completed
June 1995	Table 1 SWMU	Table 1 SWMU Phase II RFI was completed
July 1995	Table 3 SWMU	Table 3 SWMUs RFI was completed

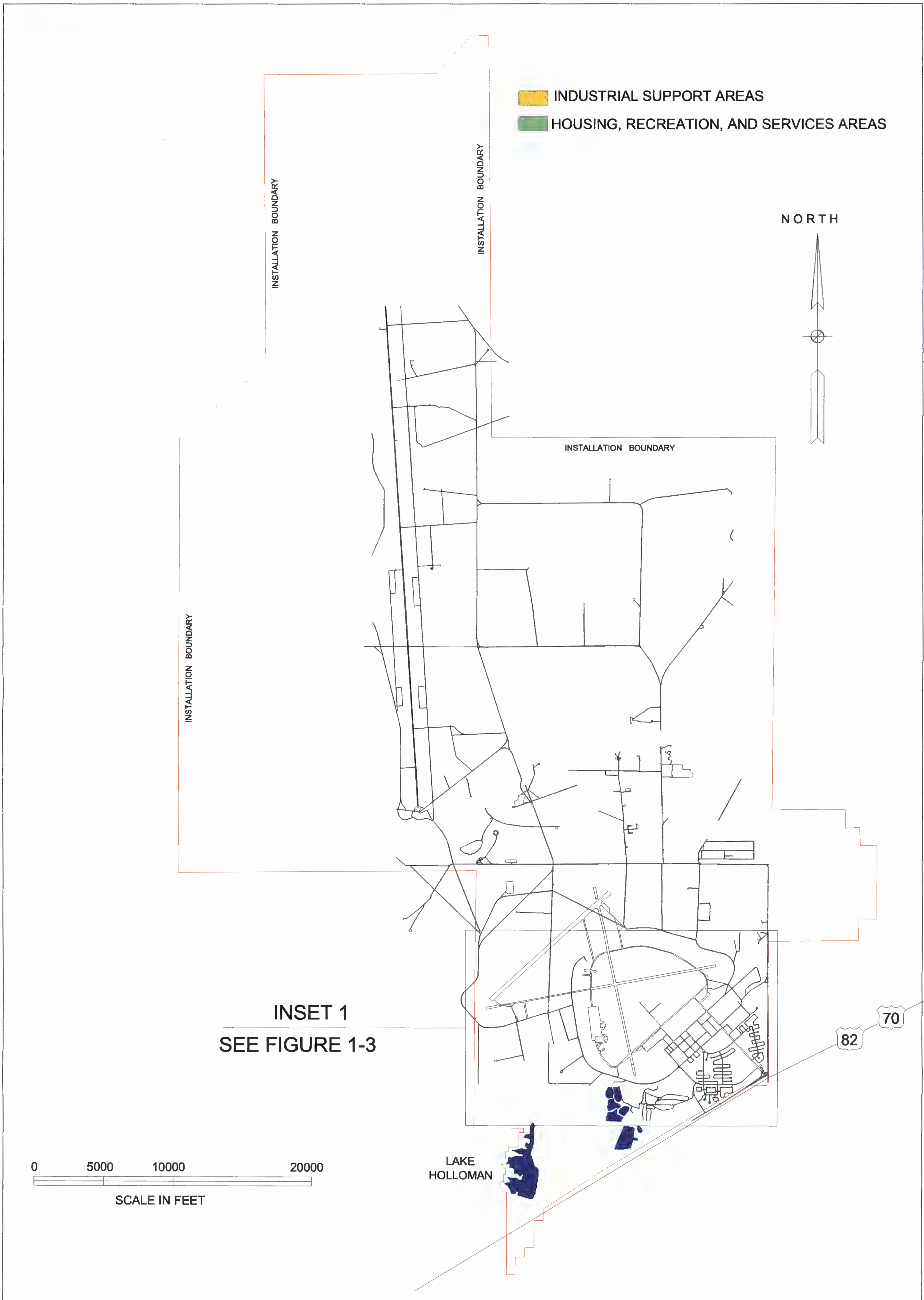
Notes:
N/A = Not available



Holloman Air Force Base
New Mexico

HOLLOMAN LOCATION MAP

Figure 1-1



Holloman Air Force Base
New Mexico

BASE LAYOUT

Figure 1-2

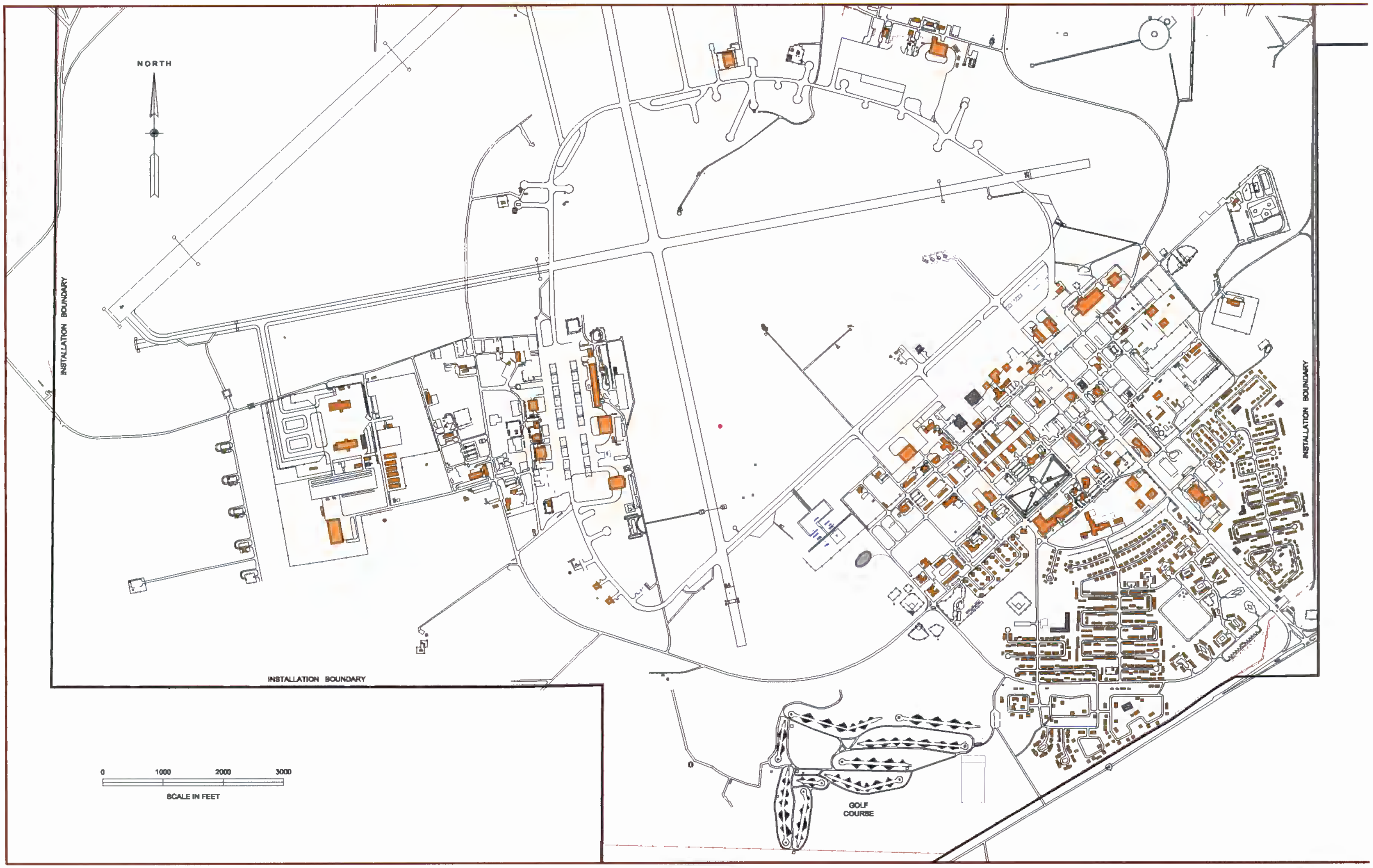
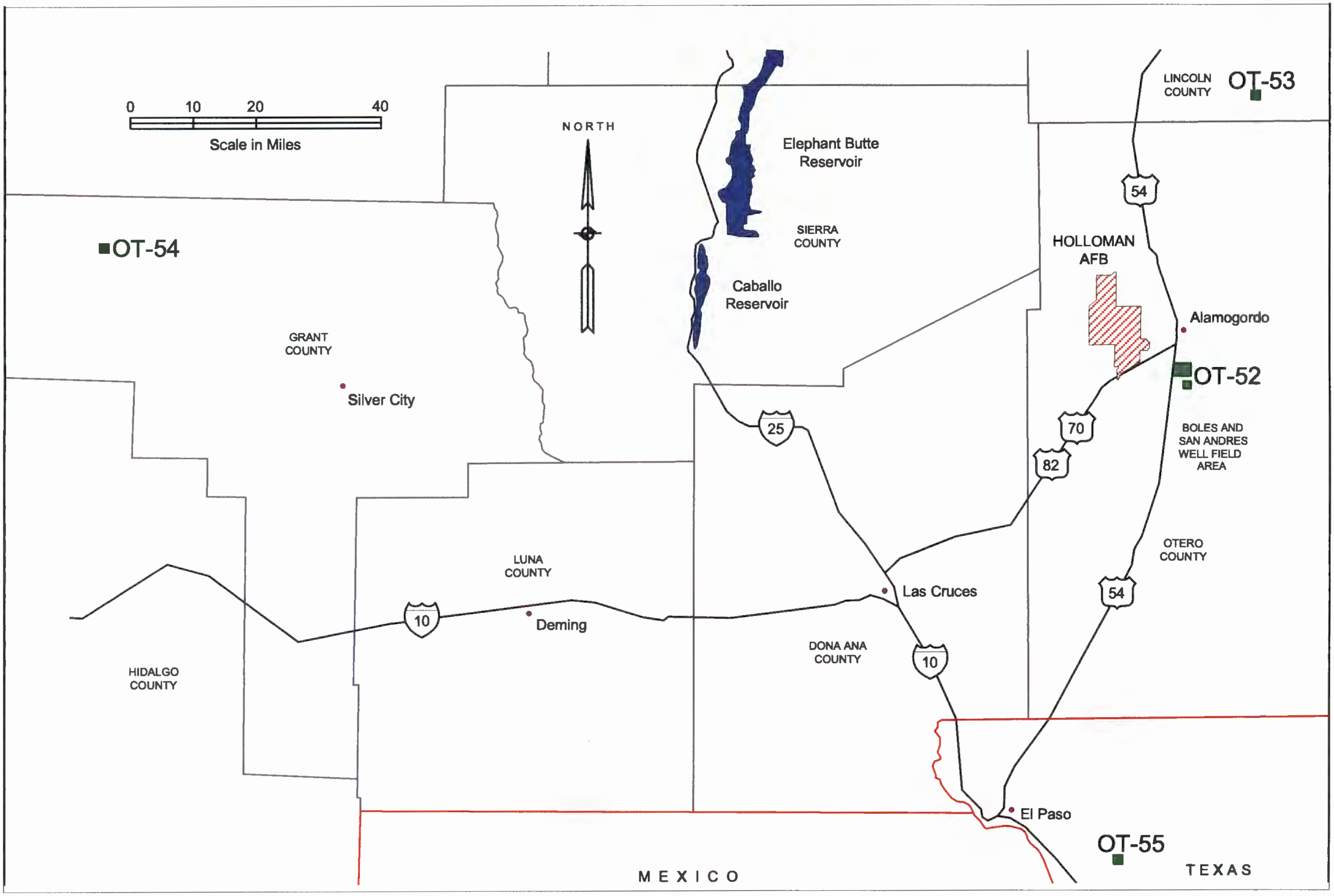


FIGURE 1-3. FACILITIES AND BUILDINGS IN MAIN BASE AREA

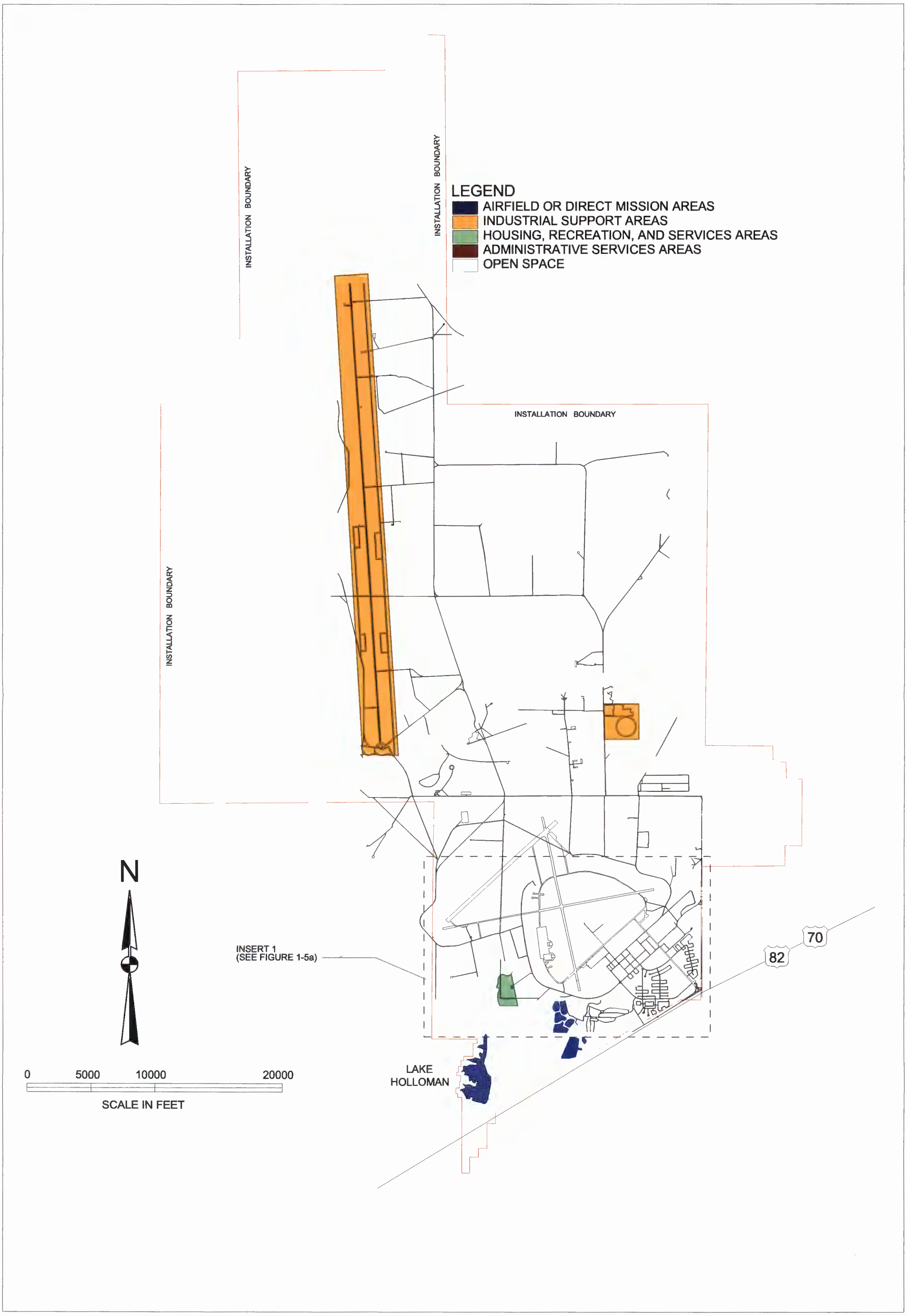
1-11

MAY 1998

Holloman Air Force Base New Mexico	HOLLOMAN MAIN BASE LAYOUT PLAN	Figure 1-3



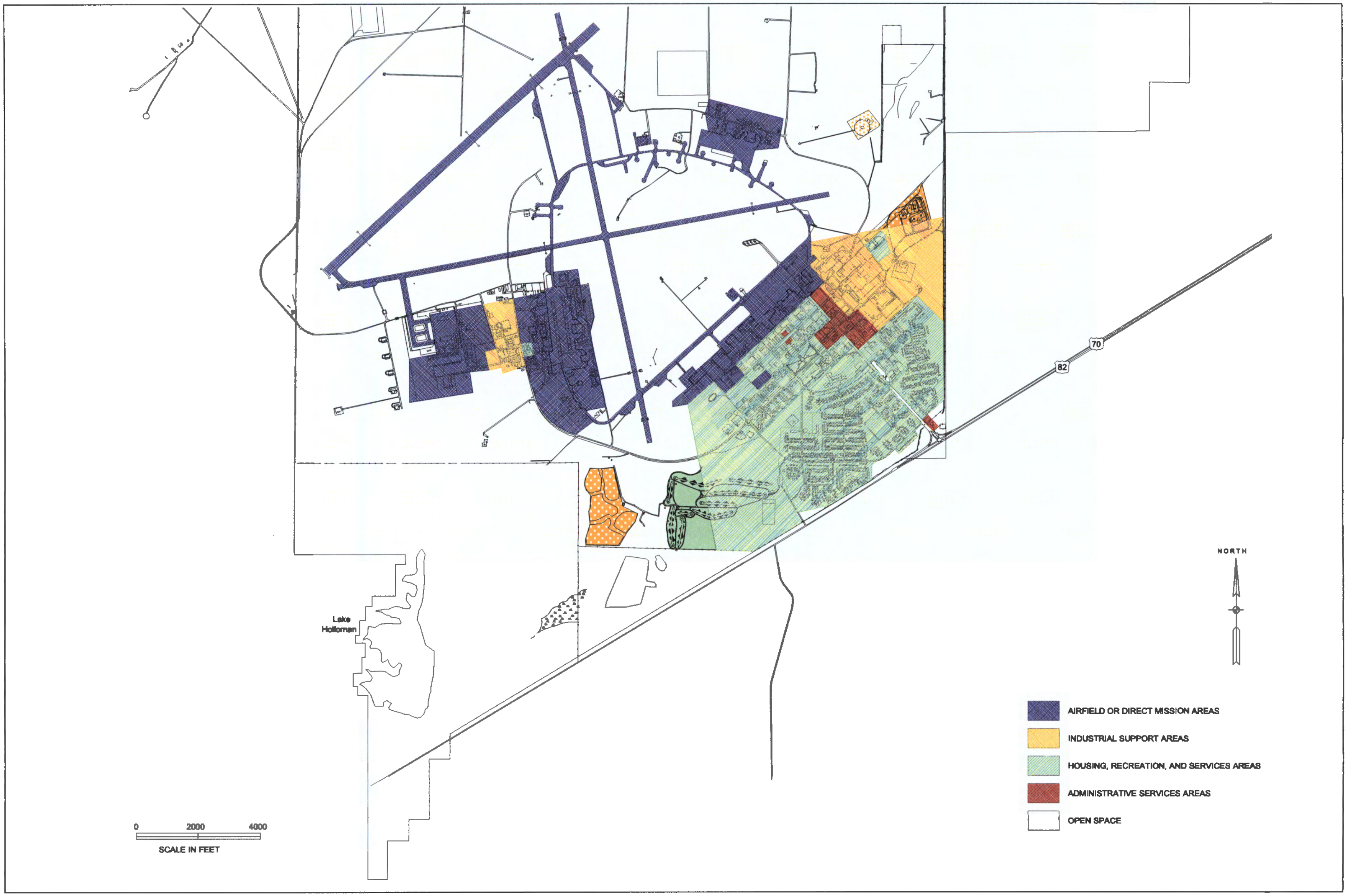
Holloman Air Force Base New Mexico	HOLLOMAN OFF-BASE PROPERTY	Figure 1-4



Holloman Air Force Base
New Mexico

PRESENT LAND USE

Figure 1-5



Holloman Air Force Base New Mexico	HOLLOMAN PRESENT LAND USE (INSET 1)	Figure 1-5a

APPENDIX A

INSTALLATION ENVIRONMENTAL RESTORATION

DELIVERABLES

A TABLE OF CONTENTS

TABLE A-1 HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

Management Action Plan
Holloman AFB, New Mexico

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
1	PA/SI	Installation Restoration Program Records Search	LF-01, SS-02, OT-03, OT-04, SS-05, SS-06, LF-07, SD-08, SS-09, LF-10, OT-11, SS-12, SS-13, OT-14, SD-15, OT-16, SS-17, SS-18, LF-19, OT-20, LF-21, LF-22, LF-23, OT-24, SD-25, SS-26, SD-27, SD-28, LF-29, DP-30, FT-31, OT-32, SD-33, OT-34, OT-35, SS-36, OT-37, OT-38, SS-39, LF-40, OT-41, RW-42, DP-43	August 1983	CH2M Hill	No Loading Required	181
2	PA/SI	Presurvey report, IRP Program: Phase IIa BX Service Station Fuel Leak Investigation	SS-17	May 1984	Dames & Moore	No Loading Required	475
3	NA	Sewage Lagoon Test Results	WP-49	March 1985	UBTL	Loading Completed	479
4	RI/FS	Installation Restoration Program: Phase II - Confirmation Quantification : Stage I		November 1986	Hazardous Materials Technical Center	Loading Pending	385
5	RI/FS	Installation Restoration Program: Phase II of Confirmation, Quantification of Stage I for Sites 1, 13, 18, 31, 32, 50, 51	LF-01, SS-13, SS-18, FT-31, OT-32, OT-44, OT-45	March 1987	Dames & Moore Engineers, Omaha District	Loading Completed	284
6	RI/FS	Installation Restoration Program: Phase II - Confirmation Quantification : Stage I	SS-17	March 1987	Dames & Moore	Loading Pending	495
7	PA/SI	Geophysical and Soil-Gas Investigations Vol. I and II	SS-17, OT-32	January 1988	Environmental Monitoring System Laboratory	No Loading Required	487-488

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
8	RI/FS	Stage I Drilling & Sampling Technical Report Phase II: Sites 1, 31, 50, 51, 53, 54, 55	LF-01, FT-31, OT-44, OT-45, SS-46, SD-47, SS-48	June 1988	Walk, Haydel & Associates, Inc.	No Loading Required	499
9	NA	A-E Quality Control Summary Report for Additional Sampling, Hazardous Waste Sewage Sludge Removal	WP-49	December 1988	Radian Corporation	Loading Pending	214
10	RI/FS	Stage I Drilling and Sampling Technical Report, Addendum I	LF-10, SD-25	December 1988/	Walk, Haydel & Associates, Inc.	No Loading Required	435
11	NA	Quality Control Summary Report, Haz. Waste Sewage Sludge Removal	WP-49	January 1989	Radian Corporation	Loading Pending	215
12	NA	A-E Groundwater Monitoring Report/Quality Control Summary for the First Groundwater Sampling Round	WP-49	October 1989	Radian Corporation	Loading Pending	505
13	NA	Quality Control Summary Report for Additional Groundwater Sampling Round	WP-49	November 1989	Radian Corporation	Loading Pending	493
14	RI/FS	Installation Restoration Program: Remedial Investigation Report Volumes I-V	LF-01, LF-10, SS-17, SD-25, FT-31, OT-44, OT-45, SS-46, SD-47, SS-48	December 1989	Walk, Haydel & Associates, Inc.	Loading Completed	511-515
15	RI/FS	Installation Restoration Program Remedial Investigation: Final Baseline Risk Assessment	LF-01, LF-10, SS-17, SD-25, FT-31, OT-44, OT-45, SS-46, SD-47, SS-48	December 1989	Walk, Haydel, & Associates, Inc.	No Loading Required	504
16	NA	Site 17, BX Service Station Addendum 1, Technical Report, Holloman Air Force Base, New Mexico	SS-17	May 1990	Walk, Haydel & Associates, Inc.	Loading Completed	239

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
17	NA	Second Monthly Groundwater Sampling Report, September 25-28, 1989	WP-49	May 1990	International Technology Corporation	Loading Completed	501
18	NA	Third Monthly Groundwater Sampling Report, November 5-8, 1989	WP-49	May 1990	International Technology Corp.	Loading Completed	502
19	NA	Fourth Monthly Groundwater Sampling Report, December 10-14, 1989	WP-49	May 1990	International Technology Corporation	Loading Completed	503
20	NA	First Semiannual Groundwater Sampling Report, January 15-17, 1990	WP-49	May 1990	International Technology Corporation	Loading Completed	241
21	RI/FS	Installation Restoration Program: Feasibility Study, Field Sampling Plan Addendum III for Site 54-POL Washrack Discharge Area	SD-47	October 1990	Walk, Haydel & Associates, Inc.	No Loading Required	520
22	NA	Risk Assessment for the Sewage Lagoon System	WP-49	February 1991	Radian Corporation	No Loading Required	58
23	NA	A-E Sampling and Quality Control Summary Report for Field Investigation of Sewage Lagoon Closure	WP-49	February 1991	Radian Corporation	Loading Completed	113
24	PA/SI	Preliminary Investigation and Site Characterization of West Ramp Fuel Contamination	SS-56	April 1991	Woodward-Clyde	Loading Completed	57
25	NA	Second Semiannual Groundwater Sampling Report, July 17 - 20, 1990	WP-49	June 1991	International Technology	Loading Completed	378

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
					Corporation		
26	NA	Background Contamination Indicator Parameter Summary Statistics for Upgradient Wells and Comparisons with Data from the Second Semiannual Groundwater Sampling Episode	WP-49	June 1991	International Technology Corporation	No Loading Required	442
27	NA	Third Semiannual Groundwater Sampling Report, January 14- 17, 1991	WP-49	June 1991	International Technology Corporation	Loading Completed	486
28	NA	Background Contamination Indicator Parameter Summary Statistics for Upgradient Wells and Comparisons with Data from the Third Semiannual Groundwater Sampling Episode	WP-49	June 1991	International Technology Corporation	No Loading Required	
29	NA	Sampling and Quality Control Summary Report for Field Investigation to Support Sewage Lagoon Closure	WP-49	June 1991	Radian Corporation	Loading Pending	490
30	NA	Quality Control Summary Report for Sewage Lagoon Surface Water Sampling	WP-49	June 1991	Radian Corporation	Loading Completed	481
31	RI/FS	Installation Restoration Program: Feasibility Study Report - Site OT-45: Old AGE Refueling Station & Site SD-47: POL Washrack Discharge Area	OT-45, SD-47	August 1991	Walk, Haydel & Associates, Inc.	No Loading Required	606

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
32	NA	Hazardous Waste Sewage Sludge Removal Laboratory Results from 10-9-90 Sampling Event	WP-49	May 1992	WT Environmental Consultants	Loading Completed	
33	RD/RA	Rapid Response Project: Free Floating Product Recovery and Soil UST Removal	SS-17	September 1991	Omaha District, CEMRO	No Loading Required	
34	NA	Fourth Semiannual Groundwater Sampling Report, July 15-19, 1991	WP-49	October 1991	Inter-national Technology Corporation	Loading Completed	484
35	NA	Background Contamination Indicator Parameter Summary Statistics for Upgradient Wells and Comparisons with Data from the Fourth Semiannual Groundwater Sampling Episode	WP-49	October 1991	Inter-national Technology Corporation	No Loading Required	483
36	NA	A-E Sampling & Quality Control Summary Report for Appendix IX Groundwater Sampling for Holloman AFB	WP-49	November 1991	Radian Corporation	Loading Completed	496
37	PA/SI	Geotechnical Investigation Report for Officer's Club	SS-57	December 1991	Sergent, Hauskins & Beckwith	No Loading Required	467
38	NA	Field Oversight and Split Sampling Report, Groundwater Assessment Monitoring	WP-49	December 1991	PRC Environmental	Loading Completed	55
39	RI/FS	Installation Restoration Program: Feasibility Study Report for Site OT-	OT-45	April 1992	Walk, Haydel & Associates, Inc.	No Loading	608

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
		45, Old Aerospace Ground Equipment Refueling Station				Required	
40	NA	Certificates of Analysis for Pesticide/Herbicide Analysis of Soil Samples	WP-49	May 1992	IT Corporation	Loading Completed	420
41	DD	Decision Document for Site OT-45, AGE Refueling Station	OT-45	May 1992	Walk, Haydel & Associates, Inc.	No Loading Required	690
45	NA	Remedial Investigation Recommendations to May 1992 Supplement to RI Report for 29 Wastes Sites	SS-02, OT-03, OT-04, SS-05, SD-08, SS-09, OT-11, OT-14, OT-16, LF-19, OT-20, LF-21, LF-22, LF-23, OT-24, SS-26, SD-28, LF-29, DP-30, SD-33, SS-36, OT-37, OT-38,SS-39, OT-41, RW-42, DP-43, WP-50, RW-51	May 1992	Radian Corporation	No Loading Required	450
46	NA	Sampling and Quality Control Summary Report: Investigation, Study and Recommendation for 29 Wastes Sites, Vols. I, II, III, and IV	SS-02, OT-03, OT-04, SS-05, SD-08, SS-09, OT-11, OT-14, OT-16, LF-19, OT-20, LF-21, LF-22, LF-23, OT-24, SS-26, SD-28, LF-29, DP-30, SD-33, SS-36, OT-37, OT-38,SS-39, OT-41, RW-42, DP-43, WP-50, RW-51	May 1992	Radian Corporation	Loading Completed	463-466
47	RI/FS	Risk Assessment Report for Remedial Investigation, Study and Recommendations for 29 Waste Sites, Volumes I - IV	SS-02, OT-03, OT-04, SS-05, SD-08, SS-09, OT-11, OT-14, OT-16, LF-19, OT-20, LF-21, LF-22, LF-23, OT-24, SS-26, SD-28, LF-29, DP-30, SD-33, SS-36, OT-37, OT-38,SS-39, OT-41, RW-42, DP-43, WP-50, RW-51	June 1992	Radian Corporation	No Loading Required	446-449

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
48	RI/FS	Sewage Lagoons: Site Characterization Report Vols I & II	WP-49	July 1992	Radian Corporation	Loading Completed	451-452
49	NA	Sampling and Quality Control Summary Report, Vol I,II,III: Sewage Lagoons Investigation	WP-49	August 1992	Radian Corporation	Loading Completed	544-546
50	NA	Site Characterization Report: Sewage Lagoon Investigation	WP-49	August 1992	Radian Corporation	Loading Completed	32
51	RI/FS	Remedial Investigation Report: Investigation, Study and Recommendation for 29 Waste Sites, Vols. I - IV	SS-02, OT-03, OT-04, SS-05, SD-08, SS-09, OT-11, OT-14, OT-16, LF-19, OT-20, LF-21, LF-22, LF-23, OT-24, SS-26, SD-28, LF-29, DP-30, SD-33, SS-36, OT-37, OT-38,SS-39, OT-41, RW-42, DP-43, WP-50, RW-51	October 1992	Radian Corporation	Loading Completed	468-470
52	NA	Holloman AFB Closing Report, Contract # 45-90-D-D9002 for Site SD-47 & OT-45	OT-45, SD-47	December 1992	IT Corporation	No Loading Required	
53	RI/FS	Remedial Investigation Report, Table 2, Phase 1	SWMUs 1-13, 15, 17, 18, 23, 24, 25, 27, 28, 29, 31, 34, 35, 37, 38	June 1993	Radian Corporation	Loading Completed	
54	RI/FS	Site Characterization: Sewage Lagoons	WP-49	June 1993	Radian Corporation	Loading Completed	
55	RI/FS	Site Characterization: Sewage Lagoons	WP-49	May 1996	Radian Corporation	Loading Completed	
56	RI/FS	RCRA Facility Investigation of Table 1 Phase 2	LF-29, FT-31, OT-04, OT-16, OT-24, OT-36, OT-39, OT-44, SD-08, SS-2 & SS-5	June 1996	Radian Corporation	Loading Completed	
57	PA/SI	Preliminary Assessment for 4 Sites	SD-15, SS-06, AOC-RR, AOC-BBMS	July 1996	Foster Wheeler Environmental	Loading Completed	

TABLE A-1 (Continued)

HISTORICAL DELIVERABLES FOR HOLLOMAN AFB

MAP Report No.	Phase	Deliverable Titles	Sites Examined (WIMS-ES ID)	Date	Author	ERPIMS Status	AR/IR File #
					Corporation	Completed	
58	LTM	Basewide Long Term Groundwater Monitoring	DP-30 & SD-33, LF-01, LF-10, LF-19, LF-21, LF-22, LF-23, OT-44, OT-45, SD-08, SS-48, SS-56	January 1997	Foster Wheeler Environmental Corporation	Loading Completed	
59	RI/FS	Phase I and Phase II RCRA Facility Investigation	SS-61 (AOC-1001)	December 1997	Foster Wheeler Environmental Corporation	Loading Completed	1125
60	LTM	Basewide Long Term Groundwater Monitoring	DP-30 & SD-33, LF-01, LF-10, LF-19, LF-21, LF-22, LF-23, LF-29, OT-16, OT-44, OT-45, SD-08, SS-02 & SS-05, SS-17, SS-39, SS-46, SS-48, SS-56	April 1998	Foothills Engineering Consultants	Loading Completed	1109
61	PA/SI	Preliminary Assessment/Site Investigation	DP-62	September 1998	Foster Wheeler Environmental Corporation	Loading Completed	
62	PA/SI	Preliminary Assessment/Site Investigation	DP-63	In Progress	Foster Wheeler Environmental Corporation	Loading Completed	
			DP-64	Pending			

Notes:
AFB = Air Force Base
UST = Underground Storage Tank

TABLE A-2 HISTORICAL DELIVERABLES ORGANIZED BY SITE/AOC FOR HOLLOMAN AFB

Management Action Plan
Holloman AFB, New Mexico

Site ID	PA/SI	RI/FS	RD/RA	NFRAP	IRA	RA-O	LTM	Comments
LF-01	1	5, 8, 14, 15					58, 60	
SS-02	1	47, 51, 56					60	
OT-03	1	47, 51						
OT-04	1	47, 51, 56						
SS-05	1	47, 51, 56					60	
SS-06	1, 57							
LF-07	1							
SD-08	1	47, 51, 56					58, 60	
SS-09	1	47, 51						
LF-10	1	10, 14, 15					58, 60	
OT-11	1	47, 51						
SS-12	1							
SS-13	1	5						
OT-14	1	47, 51						
SD-15	1, 57						60	
OT-16	1	47, 51, 56					60	
SS-17	1, 2	6, 7, 14, 15	33				60	
SS-18	1	5						
LF-19	1	47, 51					58, 60	
OT-20	1	47, 51						
LF-21	1	47, 51					58, 60	
LF-22	1	47, 51					58, 60	
LF-23	1	47, 51					58, 60	
OT-24	1	47, 51, 56						
SD-25	1	10, 14, 15						
SS-26	1	47, 51						
SD-27	1							

TABLE A-2 (Continued)

HISTORICAL DELIVERABLES ORGANIZED BY SITE/AOC FOR HOLLOMAN AFB

Site ID	PA/SI	RI/FS	RD/RA	NFRAP	IRA	RA-O	LTM	Comments
SD-28	1	47, 51						
LF-29	1	47, 51, 56					60	
DP-30	1	47, 51					58, 60	
FT-31	1	8, 14 ,15, 56						
OT-32	1	5, 7						
SD-33	1	47, 51					58, 60	
OT-34	1							
OT-35	1							
SS-36	1	47, 51, 56						
OT-37	1	47, 51						
OT-38	1	47, 51						
SS-39	1	47, 51, 56					60	
LF-40	1							
OT-41	1	47, 51						
RW-42	1	47, 51						
DP-43	1	47, 51						
OT-44		5, 8, 14, 15, 56					58, 60	
OT-45		5, 8, 14, 15, 31, 39					58, 60	
SS-46		8, 14					60	
SD-47		14, 15, 21, 31						
SS-48		8, 14, 15					58, 60	
WP-49		48, 54, 55						
WP-50		47, 51						
RW-51		47, 51						
OT-52								
OT-53								
OT-54								
OT-55								

TABLE A-2 (Continued)

HISTORICAL DELIVERABLES ORGANIZED BY SITE/AOC FOR HOLLOMAN AFB

Site ID	PA/SI	RI/FS	RD/RA	NFRAP	IRA	RA-O	LTM	Comments
SS-56	24						58, 60	
SS-57	37							
LF-58								
SS-59								
SS-60								
SS-61		59						
DP62	61							
DP-63	62							
DP-64	Pending							

Notes:
Numbers correspond to "MAP Report No." in Table A-1.
AFB = Air Force Base
UST = Underground Storage Tank
RA-O=Remedial Action Operations

APPENDIX B

DECISION DOCUMENTS FOR REMEDIAL ALTERNATIVE SELECTION AND NO FURTHER RESPONSE ACTION PLANNED (NFRAP) SUMMARIES

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B INTRODUCTION

This appendix contains two tables. The first provides a summary of remedy selection records, including Decision Documents (DDs) in which the selection of remedial actions are described.

The second table provides the No Further Response Action Planned (NFRAP) Decision Document (DD) summaries indexed by site. NFRAP decisions will include those made after:

1. The preliminary assessment (PA), where no contamination was found;

2. The site investigation (SI), where the contaminant concentrations did not exceed applicable or relevant and appropriate requirements (ARARs);

3. The remedial investigation/feasibility (RI/FS), where the levels of contamination did not pose a risk a to human health or the environment;

4. The remedial action (RA), where removal, treatment, containment, or other appropriate method was determined to be satisfactory; and

5. Long-term monitoring (LTM), where monitoring has confirmed that there is no longer a threat to human health or the environment from contamination left in place.

TABLE B-1 DECISION DOCUMENT/ROD SUMMARY STATUS

Management Action Plan
Holloman AFB, New Mexico

AFRIMS Site ID	Site Name	Selected Alternative	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
LF-01	Existing Main Base Landfill	Capping & LTM	1993	29 April 1993	Yes	April 1993
SS-02 & SS-05	POL Spill Site No. 1 and POL Spill Site No. 2	RAO	1995	3 November 1995	Yes	September 1995
OT-03	POL Tank Sludge Burial Site		1995	3 November 1995		September 1995
OT-04	Acid Trailer Burial Site	Completed NFA	1995	3 November 1995	Yes	September 1995
SS-06	Fuel Line Spill Site #2	LTM	1996	18 November 1996		September 1996
LF-07	Rubble Disposal Site		1993	29 April 1993	Yes	April 1993
SD-08	Refuse Collection Truck Washrack		1995	3 November 1995		September 1995
SS-09	Waste POL Drum Storage/Spill Area		1994	26 October 1994		September 1994
LF-10	Old Main Base Landfill	LTM	1993	29 April 1993	Yes	April 1993
OT-11	Main Base Electrical Substation	Soil removal	1994	26 October 1994	Yes	September 1994
SS-12	Fuel Line Spill Site No. 1		1995	3 November 1995		September 1995
SS-13	Sodium Arsenite Spill Site		1993	29 April 1993		April 1993
OT-14	Former Entomology Shop	Capping & LTO	1995	10 November 1995		September 1995
SD-15	Refrigeration/Heat Shop Washrack	Soil removal	1996	18 November 1996	Yes	September 1996
OT-16	Existing Entomology Shop		1999	Fall 2000		
SS-17	BX Service Station Fuel Leak Area		1996	18 November 1996		September 1996

TABLE B-1 (Continued)

DECISION DOCUMENT/ROD SUMMARY STATUS

AFRIMS Site ID	Site Name	Selected Alternative	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
SS-18	Chromic Acid Spill Site		1993	29 April 1993		April 1993
LF-19	Golf Course Landfill		1994	26 October 1994		September 1994
OT-20	Wastewater Treatment Plant Grit Burial Site		1995	3 November 1995		September 1995
LF-21	West Area Landfill No. 2		1994	26 October 1994		September 1994
LF-22	West Area Landfill No. 1		1994	31 October 1994		September 1994
LF-23	MOBSS Landfill		1994	26 October 1994		September 1994
OT-24	Former Equipment Maintenance Area		1999	Fall 2000		
SD-25	Drainage Lagoon		1993	29 April 1993		April 1993
SS-26	Possible Missile Fuel Spill Site		1994	26 October 1994		September 1994
SD-27	Pad 9 Washrack Area		1999	Fall 2000		
SD-28	Former North Area Washrack		1994	30 September 1994		September 1994
DP-30 & SD-33	Grease Trap Disposal Pits Site and Cooking Grease Disposal Pits Site		1995	3 November 1995		September 1995
OT-32	Sewer Lines From Primate Research Area		1993	29 April 1993		April 1993
OT-34	Spent Munitions Burial Site		1993	29 April 1993		April 1993
OT-35	Spent Solvent Disposal Area		1995	3 November 1995		September 1995
SS-36	Unconventional Fuel Spill Site		1999	Fall 2000		

TABLE B-1 (Continued)

DECISION DOCUMENT/ROD SUMMARY STATUS

AFRIMS Site ID	Site Name	Selected Alternative	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
OT-37	Early Missile Testing Site		1994	26 October 1994		September 1994
OT-38	Sled Test Maintenance Area		1994	31 October 1994		September 1994
SS-39	Missile Fuel Spill Area		1999	Fall 2000		
LF-40	Causeway Rubble Disposal Site		1993	29 April 1993		April 1993
OT-41	Coco Blockhouse Disposal Site		1994	26 October 1994		September 1994
RW-42	Radioactive Material Burial Site		1999	Fall 2000		
DP-43	Atlas Electrical Substations		1994	26 October 1994		September 1994
OT-44	Bldg 301–Aircraft Maintenance Hangar		1998	Fall 2000		
OT-45	Old AGE Refueling Station		1996	18 November 1996		September 1996
SS-46	JP-4 Spill Site		1993	29 April 1993		April 1993
SD-47	POL Washrack Discharge Area		1996	18 November 1996		September 1996
SS-48	Military Gas Station		1993	29 April 1993		April 1993
WP-49	Sewage Lagoons		1998			
WP-50	Waste Disposal Pit		1994	26 October 1994		September 1994
RW-51	Primate Research Lab Borehole Disposal Site		1994	31 October 1994		September 1994
OT-52	Boles and San Andres Wellfield Area		1993	29 April 1993		April 1993

TABLE B-1 (Continued)

DECISION DOCUMENT/ROD SUMMARY STATUS

AFRIMS Site ID	Site Name	Selected Alternative	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
OT-53	Bonita Lake		1993	29 April 1993		April 1993
OT-54	Silver City Radar Site		1993	29 April 1993		April 1993
OT-55	El Paso Radar Site		1993	29 April 1993		April 1993
SS-56	West Ramp Fuel Spill		1996	18 November 1996		September 1996
LF-58	Incinerator Landfill		1999	Fall 2000		
SS-60	Bldg 828 Fuel Spill		1999	Fall 2000		

TABLE B-2 NO FURTHER RESPONSE ACTIONS PLANNED DOCUMENT STATUS

Management Action Plan
Holloman AFB, New Mexico

AFRIMS Site ID	Site Name	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
LF-01	Existing Main Base Landfill	1993	29 April 1993		April 1993
OT-03	POL Tank Sludge Burial Site	1995	3 November 1995		September 1995
OT-04	Acid Trailer Burial Site	1995	3 November 1995		September 1995
SS-06	Fuel Line Spill Site #2	1996	18 November 1996		September 1995
LF-07	Rubble Disposal Site	1993	29 April 1993		April 1993
SS-09	Waste POL Drum Storage/Spill Area	1994	26 October 1994		September 1994
LF-10	Old Main Base Landfill	1993	29 April 1993		April 1993
OT-11	Main Base Electrical Substation	1994	26 October 1994		September 1994
SS-12	Fuel Line Spill Site #1	1995	3 November 1995		September 1995
SS-13	Sodium Arsenite Spill Site	1993	29 April 1993		April 1993
SD-15	Refrigeration/Heat Shop Washrack	1996	18 November 1996		September 1996
SS-18	Chromic Acid Spill Site	1993	29 April 1993		April 1993
LF-19	Golf Course Landfill	1994	26 October 1994		September 1994
OT-20	Waste Water Treatment Plant Grit Burial Site	1995	3 November 1995		September 1995
LF-21	West Area Landfill No. 2	1994	26 October 1994		September 1994
LF-22	West Area Landfill No. 1	1994	31 October 1994		September 1994
LF-23	MOBSS Landfill	1994	26 October 1994		September 1994
OT-24	Former Equipment Maintenance Area	Pending			
SD-25	Drainage Lagoon	1993	29 April 1993		April 1993
SS-26	Possible Missile Fuel Spill Site	1994	26 October 1994		September 1994

TABLE B-2 (Continued)

NO FURTHER RESPONSE ACTIONS PLANNED DOCUMENT STATUS

AFRIMS Site ID	Site Name	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
SD-27	Pad 9 Washrack	Pending			
SD-28	Former North Area Washrack	1994	30 September 1994		September 1994
DP-30 & SD-33	Grease Trap Disposal Pits Site and Cooking Grease Disposal Pits Site	1995	3 November 1995		September 1995
OT-32	Sewer Lines From Primate Research Area	1993	29 April 1993		April 1993
OT-34	Spent Munitions Burial Site	1993	29 April 1993		April 1993
OT-35	Spent Solvent Disposal Area	1995	3 November 1995		September 1995
SS-36	Unconventional Fuel Area	Pending			
OT-37	Early Missile Testing Site	1994	26 October 1994		September 1994
OT-38	Sled Test Maintenance Area	1994	31 October 1994		September 1994
LF-40	Causeway Rubble Disposal Site	1993	29 April 1993		April 1993
OT-41	Coco Blockhouse Disposal Site	1994	26 October 1994		September 1994
RW-42	Radioactive Material Burial Site	Pending			
DP-43	Atlas Electrical Substations	1994	26 October 1994		September 1994
OT-44	Building 301, Aircraft Maintenance Hangar	1991	30 September 1991		
OT-45	Old AGE Refueling Station		1996		
SS-46	JP-4 Spill Site	1993	29 April 1993		April 1993
SD-47	POL Washrack Discharge Area		1996		
SS-48	Military Gas Station	1993	29 April 1993		April 1993
WP-50	Waste Disposal Pit	1994	26 October 1994		September 1994
RW-51	Primate Research Lab Borehole Disposal Site	1994	31 October 1994		September 1994
OT-52	Boles and San Andres Wellfield Area	1993	29 April 1993		April 1993
OT-53	Bonito Lake	1993	29 April 1993		April 1993

TABLE B-2 (Continued)

NO FURTHER RESPONSE ACTIONS PLANNED DOCUMENT STATUS

AFRIMS Site ID	Site Name	Date Written	Date Signed	State Concurrence (yes or no)	State Signature
OT-54	Silver City Radar Site	1993	29 April 1993		April 1993
OT-55	El Paso Radar Site	1993	29 April 1993		April 1993
SS-56	West Ramp Fuel Spill	1996	18 November 1996		September 1996
LF-58	Incinerator Landfill	Pending			

Notes:
EOD = Explosive Ordnance Disposal
UST = Underground Storage Tank

APPENDIX C1

SITE DESCRIPTIONS

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C1-1 INTRODUCTION

Holloman Air Force Base (AFB) is located approximately 7 miles west of Alamogordo, New Mexico. Included under the jurisdiction of Holloman AFB are the following off-Base sites:

- Boles and San Andres Well Field Area (Base water supply)
- Bonito Lake (Base water supply)
- El Paso Radar Site
- Silver City Radar Site

Information presented in this appendix does not necessarily represent what has been or will be approved by the USAF or state and federal regulatory agencies. As additional data becomes available, actual strategies could be dramatically different. This would then be reflected in future updates to the MAP.

Holloman AFB is conducting environmental restoration efforts under the USAF ERP and RCRA corrective action program. Although this Base has not been placed on the National Priorities List (NPL), Holloman AFB is conducting the ERP program under the general provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and RCRA. Regulatory review is provided by the U.S. Environmental Protection Agency (EPA) Region VI, New Mexico Environment Department (NMED), and the New Mexico Defense and State Memorandum of Agreement (DSMOA) program.

There are 64 ERP sites associated with Holloman AFB, 60 of which are located on the main Base. Three remote sites are located in southern New Mexico, and one remote site is located in extreme west Texas. Of the 64 ERP sites, three are in the PA/SI or RI stages, 9 are undergoing RA-O, 15 are closed with long-term monitoring, one is undergoing IRA, and 36 are response complete with no RA-O or LTM.

No additional work is planned for the following sites:.

- OT-03 POL Tank Sludge Burial Site (LTM is performed under SS-02/05)
- OT-04 Acid Trailer Burial Site
- SS-06 Fuel Line Spill
- LF-07 Rubble Disposal Site
- SS-09 Waste Petroleum, Oil, and Lubricants (POL) Drum Storage/Spill Area
- OT-11 Main Base Electrical Substation
- SS-12 JP-4 Fuel Line Spill Site
- SS-13 Sodium Arsenite Spill Site
- SD-15 Refrigeration/Heat Shop Washrack
- SS-18 Chromic Acid Spill Site
- OT-20 Wastewater Treatment Plant Grit Burial Site
- OT-24 Former Equipment Maintenance Area
- SD-25 Possible Drainage Lagoon Disposal Site
- SS-26 Possible Missile Fuel Spill Site
- SD-27 Pad 9 Washrack
- SD-28 Former North Area Washrack

- OT-32 Sewer Lines from the Primate Research Lab
- OT-34 Spent Munitions Burial Site
- OT-35 Spent Solvent Disposal Area
- SS-36 Unconventional Fuel Area
- OT-37 Early Missile Testing Site
- OT-38 Sled Test Maintenance Area
- LF-40 Causeway Rubble Disposal Site
- OT-41 Coco Blockhouse Borehole Disposal Site
- RW-42 Radioactive Material Burial Site
- DP-43 Atlas Electrical Substations
- OT-45 Old AGE Refueling Station
- SD-47 POL Washrack Discharge Area
- WP-50 Waste Disposal Pit
- RW-51 Primate Research Lab Borehole Disposal Site
- OT-52 Boles and San Andres Wellfield Area
- OT-53 Bonito Lake
- OT-54 Silver City Radar Site
- OT-55 El Paso Radar Site
- LF-58 Incinerator Landfill
- SS-60 Bldg 828 Fuel Spill Site

Twenty-five ERP sites that have been approved for, or are scheduled for approval for no further action are undergoing remedial action operation (RA-O) or are required to implement a long-term groundwater monitoring (LTM) program as a condition of close out. The RA-O/LTM sites are:

- LF-01 Main Base Landfill
- SS-02 POL Spill Site No. 1
- OT-03 POL Tank Sludge Burial Site (in conjunction with SS-02 and SS-05)
- SS-05 POL Spill Site No. 2
- SD-08 Refuse Collection Truck Washrack
- LF-10 Old Main Base Landfill
- OT-14 Former Entomology Shop (Annual inspection and maintenance is ERP funded)
- OT-16 Entomology Shop
- SS-17 BX Service Station Fuel leak Area
- LF-19 Golf Course Landfill
- LF-21 West Area Landfill No. 2
- LF-22 West Area Landfill No. 1
- LF-23 MOBSS Landfill
- LF-29 Former Army Landfill
- DP-30 Grease Trap Disposal Pits
- FT-31 Fire Department Training Area (DD anticipated in 2003)
- SD-33 Cooking Grease Disposal Pits
- SS-39 Missile Fuel Spill Area

- OT-44 Maintenance Hangar Site
- SS-46 JP-4 Spill Site
- SS-48 Military Gas Station
- WP-49 Sewage Lagoons
- SS-56 West Ramp Fuel Spill Area
- SS-57 Officer's Club
- SS-59 T-38 Test Cell Fuel Spill (Not ERP eligible)

Of the above RA-O/LTM sites, the following sites are anticipated to be closed **with RA-O/LTM** by end of FY 2004:

- SS-17 BX Service Station Fuel leak Area
- FT-31 Fire Department Training Area
- SS-57 Officer's Club

This report is based upon past major ERP investigations completed by:

- CH2M Hill, Gainesville, Florida
  Phase I—Preliminary Assessment Records Search
- Dames and Moore, Park Ridge, Illinois
  Phase II, Stage I—Remedial Investigation
- Walk, Haydel & Associates, New Orleans, Louisiana
  Phase II, Stage II—Remedial Investigation and Decision Documents
- Radian Corporation, Austin, Texas
  RCRA Monitoring—Sewage Lagoons and Remedial Investigation

C1-2 SITE DESCRIPTIONS

The Phase I Environmental Restoration Program Records Search (CH2M Hill, 1983), Environmental Restoration Program, Phase II - Confirmation/Quantification, Stage 1 (Dames & Moore, 1987), Environmental Restoration Program, Remedial Investigation, Remedial Investigation Report (Walk, Haydel, & Associates, Inc., 1989), Draft Remedial Investigation (RI) Report, Investigation, Study and Recommendation for 29 Waste Sites (Radian Corp., 1992), Closure Plan for Sewage Treatment Lagoons (Radian Corp., 1990), Environmental Restoration Program, Remedial Investigation, Site 17, BX Service Station, Addendum 1, Technical Report (Walk, Haydel & Associates, 1990), Site Closeout Report Investigation, Study and Recommendation for 29 Waste Sites (Radian Corp., Jan. 1983), and Feasibility Study - Investigation, Study and Recommendations for 29 Waste Sites (Radian Corp., Feb. 1993) were used as the primary references for these site descriptions.

The U.S. Department of Agriculture (USDA) Soil Conservation Service has identified two soil associations in the vicinity of Holloman AFB: the Holloman-Gypsum Land-Yesum complex, and the Mead silty clay loam. The permeability of these soil horizons ranges from 4×10^{-4} to 1×10^{-3} cm/sec.

Most of the surficial soils at the Base are the well-drained, sandy loam and gypsum of the Holloman-Gypsum Land-Yesum complex. The soils of this association are formed from alluvial and eolian gypsiferous sediments. The Holloman unit makes up about 35 percent of the complex. It is a light brown to pink, very fine sandy loam with a high gypsum content. The soil is moderately permeable, calcareous, and mildly to moderately alkaline. The Gypsum land unit makes up about 30 percent of the complex. It is soft to hard white gypsum typically overlain by less than one inch of very fine, sandy loam. The Yesum unit, which makes up 20 percent of the complex, is light brown to pinkish-white, very fine sandy loam that is also high in gypsum. It is moderately permeable, calcareous, and mildly alkaline (USDA, 1981).

All of the sites have been ranked by relative risk. The rankings can be found in Figure ES-1 in the Executive Summary of this report. Thirty-four of the sites were evaluated using the Hazard Assessment Rating Methodology (HARM) in the ERP Phase I report (CH2M Hill, 1983).

No information on ERA-Eligibility justification for the sites is available from the Base or HQACC at this time.

The following site descriptions are presented in numerical order; the date each Decision Documents (DD) was signed by the State is indicated where applicable. (Some DDs have been signed only by the Base and the sites are considered closed; however signature of those DDs by the State is pending.)

C1-2.1 LF-01--EXISTING MAIN BASE LANDFILL (SWMU 106)

The Existing Main Base Landfill was in operation from 1958 to 1996. It was closed under the New Mexico Solid Waste Regulations in 1997. The active area of the trench is reported to be approximately 150 feet wide, 300 feet long, and 30 feet deep. The entire fenced area designated for the landfill is approximately 210 acres. The landfill is located east of the Fire Protection Training Area (FPTA) and north of the POL Storage Area.

The landfill utilized the trench-and-fill disposal method and was operated by a private contractor. The contractor was also responsible for refuse pickup. The landfill received domestic solid waste and nontoxic, nonhazardous solid waste materials from the industrial shops. Small quantities of waste oils, solvents, and pesticides are known to have been disposed of at this site in the past.

The Phase I Records Search conducted by CH2M Hill (1983) reported that potential exists for migration of hazardous waste from the landfill (overall HARM score of 47). The Phase II Remedial Investigation (RI) conducted by Dames and Moore (1987) installed three monitoring wells at the landfill to depths ranging from 34 to 58 feet below ground level (BGL). The Phase II report concluded that the groundwater has relatively high levels of lead, cadmium, silver, and oil and grease, and very high levels of total organic halogens (TOX). The high levels of TOX may be naturally occurring in the groundwater.

Five more monitoring wells were installed and six landfill cap samples were collected for the 1989 Walk, Haydel, and Associates, Inc. RI. Three metals (chromium, iron, and manganese) were detected in relatively high levels; however, it appears that the concentrations were not above background. Groundwater occurs approximately 30 feet BGL at this site. The hydraulic gradient is towards the northeast.

The Long-Term Monitoring alternative proposed for this site in the 1993 decision document (DD) was based on the conclusion that Site LF-01 poses no significant risk to public health or the environment. The DD was approved and signed by NMED in April 1993. Long-term monitoring for methane is being conducted at this site through FY 2007 in support of closure activities.

C1-2.2 SS-02–POL SPILL SITE NO. 1 (AOC-T)

The POL Spill Site No. 1 is located in the vicinity of 14 former 25,000-gallon aboveground storage tanks in the POL Storage Area. The spill site is located about 900 feet from the base boundary and 500 feet from the nearest drainage ditch. The site covers an area of about one-third acre. Another spill (POL Spill Site No. 2 [SS-05]) occurred on the southeastern corner of Spill Site No. 1. The sites overlap and are difficult to distinguish from each other.

From the early 1960s to the early 1970s, the former aboveground fuel tanks (25,000 gallon) contained in the POL storage area were periodically overtopped with JP-4 and aviation gasoline (AVGAS). Most of these fuels were retained in the POL area and recovered. The tanks were removed in 1987.

The site has fairly flat terrain. Dillard Draw is located approximately 500 feet to the east of the site. Site stratigraphy consists primarily of clean to silty sand deposits interbedded with silt and clay lenses. Groundwater occurs in a shallow unconfined aquifer beneath the site approximately 15 feet BGL in the sand and silty sand deposits. Groundwater flows toward the southeast under this site.

The CH2M Hill 1983 Phase I Records Search first described this site (overall HARM score of 39). Sixteen borings were drilled at Sites SS-02 and SS-05 for the 1992 Radian RI, twelve located inside of the former bermed areas and four outside the southeast corner of the bermed area. In addition, six groundwater wells were installed in the area.

Lead was detected in elevated levels in the soil. Elevated levels of petroleum hydrocarbons, benzene, ethylbenzene, and methyl ethyl ketone were found in the soil. In addition, methylene chloride, toluene, and xylenes were detected in the soil samples. However, these compounds were also detected in the trip blank, so their presence in the natural samples remains uncertain.

Antimony, cadmium, and lead were found in high levels in the groundwater. In addition, benzene, ethylbenzene, xylenes, and 1,2-dichloroethane were detected in the groundwater.

Additional work was completed in the spring 1993 as part of a Pre-Design Investigation (PDI) to accurately delineate the area to be addressed in the remedial action. Soil gas and soil borings were conducted at the site around the bermed area.

Using the information from the PDI, the feasibility study (FS) was completed by Radian in December 1993. It recommended soil vapor extraction (SVE) to clean up soil containing total recoverable petroleum hydrocarbons (TRPH) >1000 mg/kg. The selected remedy was approved in the DD which was signed by NMED in September 1995. Following the FS, a design was completed by IT Corporation, and construction was completed April 1, 1995. The SVE system has been running continuously and is anticipated to complete cleanup by the end of 2005.

As a requirement by EPA Region VI, additional groundwater sampling was conducted to determine the horizontal extent of benzene. The RCRA facility investigation (RFI) report concluded that no complete groundwater exposure pathway was present and that the site does not pose an unacceptable risk to human health or the environment. Long-term groundwater monitoring is being performed at the site every other year for a period of 5 years and will be completed in FY 2006.

C1-2.3 OT-03–POL TANK SLUDGE BURIAL SITE (SWMU 114)

The POL Tank Sludge Burial Site is a small area (less than one-quarter acre) located along the fence east of the POL storage area and south of the main Base landfill. The areal extent of the disposal area is approximately 10 feet by 6 feet. The depth of the pit is 4 feet. This site is adjacent to POL Spill Sites Nos. 1 and 2 (Sites SS-02 and SS-05).

The site was intermittently used from 1955 to 1975 for disposal of sludges from fuel storage tanks [AVGAS, JP-4, motor gasoline (MOGAS)]. The contents of the pit at the disposal site consisted of rags, iron fragments, and dark red stained soil.

The terrain, geology, and hydrogeology of this site is similar to Sites SS-02 and SS-05. The white soil surrounding the site is highly gypsiferous with a pH of 8-10.

In January 1980, six soil samples were analyzed from the site by the bioenvironmental engineering staff. Analytical results for lead indicated elevated concentrations and averaged approximately 1,000 parts per million (ppm) for the six samples. However, these samples were not analyzed according to RCRA standard procedures. Soil samples were collected again from the site in August 1982 and were analyzed by RCRA standards. The values found not only for lead, but for all metals were within acceptable limits of RCRA standards.

The 1983 Phase I Records Search (CH2M Hill) first described this site (overall HARM score of 38). In the 1992 Radian RI, two trenches were dug to confirm the location of the trench. Twelve surface samples were collected for lead analysis, and one soil boring was drilled through the disposal pit. One monitoring well was installed through the burial pit.

One of the surface soil samples had elevated levels of lead. The sample from the waste burial pit had high levels of lead (3,750 ppm) ethylbenzene, xylenes, and petroleum hydrocarbons. Lead and petroleum hydrocarbons were found in the soil beneath the pit. Lead concentrations ranging from 157 to 550 ppm are documented (letter dated 26 August 1980) 10 to 30 feet outside the pit. Volatile organics and lead were found in elevated concentrations in the groundwater. This groundwater contamination may be due to the POL spill sites located about 50 feet upgradient.

Excavation and off-site disposal in a landfill was completed in 1994 by Rinchem, Inc., and the Omaha Army Corps of Engineers. Long-term groundwater monitoring is being performed at the site, but only in conjunction with LTM at adjacent Sites SS-02 and SS-05. The No Action alternative was approved for this site in the DD report based on the conclusion that Site OT-03 poses no significant risk to human health and the environment. The DD was signed by NMED in September 1995.

C1-2.4 OT-04–ACID TRAILER BURIAL SITE (SWMU 102)

Around 1958, an empty fuming nitric acid transport trailer was buried in the North Base Area, located adjacent to an arroyo named Ritas Draw. The trailer was washed out with water prior to burial. In addition to the trailer, waste materials were dumped and buried on a one-half acre tract in three drainages of a side channel to Ritas Draw. The majority of the waste at the site probably originated from the former Unconventional Fuels Storage Area.

This site is located on fairly steep terrain with a relief of about 35 feet. The area drains north to Ritas Draw, and the stratigraphy of the site has fine-grained silty sands with lenses of clean sand and silt. The groundwater occurs at about 40 feet BGL (relative to top of arroyo) and 5 feet BGL (relative to bottom of arroyo). The local groundwater flow is to the northwest.

The Phase I Records Search (CH2M Hill, 1983) first described this site, but no hazard ranking was assigned. A magnetic survey was conducted and four monitoring wells were installed for the 1992 Radian RI. Nineteen exploratory pits were dug. Wastes excavated included laboratory equipment, solid rocket boosters, and over 100 amber bottles containing chemical compounds. Picric acid was found in seven bottles and was destroyed on site. Other wastes were lab-packed and moved to the Base's hazardous waste storage facility. Although relatively elevated concentrations of metals (antimony, cadmium, selenium) were noted in the groundwater, none of these levels are believed to be above background concentrations.

Removal of the tank car, mixed debris, and related contaminated soil was completed in 1994. A chain-link fence currently surrounds the site. Groundwater was investigated to demonstrate that no release was made to the subsurface. The No Action alternative was approved for this site in the DD report signed by NMED in September 1995 based on the conclusion that Site OT-04 poses no significant risk to human health or the environment.

C1-2.5 SS-05–POL SPILL SITE NO. 2 (AOC-T)

In 1978, approximately 30,000 gallons of JP-4 fuel was spilled when the drain valve for the 4-inch fuel line for the main JP-4 fuel tank (Tank No. 7) in the POL area was accidentally left open. Approximately 95 percent of the fuel was recovered with the remainder of the fuel seeping into the gravel base of the POL storage area.

The site description and investigation and DD report are discussed in Section C1-2.2 of this Appendix. The Phase I Records Search (CH2M Hill, 1983) first described this site (overall HARM score of 39). The 1992 Radian RI investigated this site, combining it with POL Spill Site No. 1 (SS-02). An SVE system has been implemented as a remedial action (RA) for Sites SS-02 and SS-05 to remediate TRPH-contaminated soil. (See Section C1-2.2 of this appendix for additional discussion of the SVE treatment.) Long-term groundwater monitoring is being performed at the site every other year through FY 2006.

C1-2.6 SS-06–FUEL LINE SPILL SITE NO. 2 (AOC-R)

In 1979, a Base road grader was operating in the area approximately 200 feet south of the POL storage area. The grader ruptured the JP-4 fuel line and before the fuel flow could be stopped, approximately 8,000 gallons of JP-4 was spilled onto the ground. Clean-up operations were immediately initiated and the majority of the fuel was recovered. The spill area was located 500 feet from the Base boundary and 500 feet from the nearest drainage ditch. Groundwater is located approximately 12 feet BGL at this site with the hydraulic gradient towards the southeast.

No subsequent ERP remedial action work has been conducted at this site since the 1983 Records Search conducted by CH2M Hill (overall HARM score of 39).

A preliminary assessment/site investigation (PA/SI) was completed in October 1995. No petroleum-related constituents were detected in soil or groundwater samples collected during the PA/SI, indicating that the 1979 release did not result in an impact to the subsurface. Although some Target Analyte List (TAL) metals were detected in some soil and groundwater samples above Basewide background levels, none of these concentrations exceeded the corresponding risk-based level with the exception of aluminum, which is not considered a site-related contaminant. The site was closed with No Further Action recommended. A DD was signed by NMED for Site SS-06 in September 1996.

C1-2.7 LF-07--RUBBLE DISPOSAL SITE (SWMU 110)

From 1965 (assumed) to the present, construction materials (wood, sheet metals, wire, nails, etc.) have been disposed of at the Rubble Disposal Site located southeast of the POL storage area and just west of the Base boundary.

The ERP Phase I study (CH2M Hill, 1983) determined that no known or suspected hazardous wastes have been buried at the site. Therefore, Site LF-07 did not have a hazard assessment performed on it. The Phase I report concluded that the site was not considered to present significant concern for adverse affects on the health and environment, and was not examined during ERP Phase II studies. Groundwater is located approximately 12 feet BGL under this site. The hydraulic gradient is towards the southeast. The No Further Action alternative for this site was recommended and approved in the DD signed by NMED in April 1993.

C1-2.8 SD-08--REFUSE COLLECTION TRUCK WASHRACK (SWMU 82)

The Refuse Collection Truck Washrack Yard occupies approximately one-half acre and is located southwest of the POL Storage Area and north of the Main Base Area. Refuse collection trucks and equipment were washed with soap and water with the rinse waters being discharged to the Base sewer system. The refuse collection truck washrack had been located at this site since the beginning of Base operations in 1942, but was recently relocated. One interviewee indicated that pesticides were routinely sprayed inside the trucks during the 1970s for fly control. The current refuse collection contractor indicated that this has not been done since 1981

The old oil/water separator and sump at the northeast end of the washrack tended to overflow when the sewer line from the washrack clogged. Other washrack yard areas of concern include an engine oil drum storage basin, cracks in the concrete of the washrack, and general stains in the soil through out the site.

Topography is fairly flat in this area. The fenced yard around the washrack is unpaved and has no natural vegetation. The area stratigraphy consists of fine-grained silty sands. Groundwater occurs in a shallow unconfined aquifer beneath the site approximately 12 feet BGL. Groundwater flows northeast toward Dillard Draw.

The 1983 Phase I Records Search first described this site (overall HARM score of 43). Six soil borings were drilled and three monitoring wells were installed in this area for the 1992 Radian RI. Five pesticides were found in the soil (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, and chlordane). Elevated levels of beryllium and lead were also found in the soil. The pesticides aldrin, chlordane, dieldrin, heptachlor, heptachlor epoxide and gamma-BHC were detected in concentrations above action levels for the groundwater. In addition, benzene, ethylbenzene, and 1,2-dichloroethane were detected in concentrations exceeding action levels.

A FS was completed in December 1993. An asphalt cap was recommended to mitigate risk posed to human health through dermal exposure and inhalation. A remedial design was completed for this site in 1995. The selected remedy was approved in the DD signed by NMED in September 1995. The RA consisted of installation of an asphalt cap with an impermeable liner over affected soils, installation of a chain-link fence to restrict site access, annual inspection and maintenance of the cap, and long-term groundwater monitoring. The asphalt cap was installed in October 1996; and the site was closed with long-term groundwater monitoring which will continue through FY 2007.

C1-2.9 SS-09–WASTE POL DRUM STORAGE/SPILL AREA (SWMU 42)

The Waste POL Drum Storage/Spill Area is located west of Building No. 195 in the Main Base Area. The area of interest is approximately 500 by 600 feet.

Between the years of 1965 to 1980, the majority of waste engine oils, hydraulic and transmission fluids, solvents, and waste fuels stored here were in 55-gallon drums. The drums of stored material from this location were either burned during fire training exercises or processed for subsequent service contract action for off-Base recycle or disposal. Numerous small spills and overflowing of drums (particularly during the summertime) have occurred.

Site topography is generally flat, and the area is an open field with vegetation. Site lithology consists primarily of silts with lenses of silty sand and/or clay. Groundwater occurs in a shallow unconfined aquifer approximately 8 feet BGL. Groundwater flowed east toward Dillard Draw in November 1991. An additional water level survey performed in March 1992 showed a change in groundwater flow to the south-southwest. The shift in groundwater direction may be due to changing hydrologic conditions throughout the year.

The 1983 Phase I Records Search conducted by 1983 first described this site (overall HARM score of 42). Five soil borings were drilled and four monitoring wells were installed at this site for the Radian 1992 RI. Petroleum and lead contamination is restricted to the surface soils. No contamination was found in the groundwater.

The No Action alternative was approved in the DD signed by NMED in September 1994 based on a determination that the site did not pose and unacceptable environmental risk.

C1-2.10 LF-10--OLD MAIN BASE LANDFILL (SWMUS 101 AND 109)

The Old Main Base Landfill was operated from 1942 to 1958. This landfill covered an area of approximately 20 acres just north of the existing residential housing area and east of the civil engineering complex. The landfill received base domestic solid waste, and one interviewee indicated that some drums containing waste oils and solvents may have been disposed of at this landfill in the past. A Base incinerator was located in this area in the past, and the ash from this operation was also buried in the landfill. Eventually, the SPACECOM (now Base COM Squadron) complex was built over most of the old landfill. Groundwater occurs approximately 15 feet BGL at this site. The hydraulic gradient is towards the southeast.

Site LF-10 was initially investigated under Phase I Records Search (CH2M Hill, 1983). This report concluded that further investigative work was not necessary, and no hazard assessment was performed. However, in 1987 a geotechnical subsurface investigation was conducted within the SPACECOM complex in order to determine why the hardstand was showing structural failure. Sludge and other chemicals were found in the borings of the geotechnical investigation. Therefore, it was decided that a RI be performed on this site. Seven monitoring wells were installed, fourteen soil borings were drilled, and three Dennison cores were collected for the 1989 Walk, Haydel and Associates, Inc. RI. The RI concluded that there was no significant contamination at Site LF-10. However, further investigation work was recommended northwest of this site around the Refuse Collection Truck Washrack (Site SD-08).

Due to the lack of contamination, the Long-Term Monitoring alternative was recommended for this site and the DD for closure with LTM through FY 2007 was signed by NMED in April 1993. The report stated that Site LF-10 poses no significant risk to public health or the environment.

C1-2.11 OT-11–MAIN BASE ELECTRICAL SUBSTATION (SWMU 107)

The Main Base Electrical Substation is located just north of the Main Base Area near the eastern boundary of the installation. Until 1979, the standard practice of exterior electric shop personnel was to dispose of transformer insulation oil on the ground in the vicinity of the substation. Groundwater occurs approximately 15 feet BGL. The hydraulic gradient is towards the southeast.

In March 1979, the Base Bioenvironmental Engineer collected samples of the oil-stained soils around the substation and submitted them for PCBs analysis. It was reported that no PCBs were detected in the soil samples. Near surface PCB soil contamination and TRPH soil contamination are documented in the RI Report (Radian Corp., October 1992).

The practice (since 1974) was to collect and turn in all transformer oils to the Defense Reutilization and Marketing Office (DRMO). Analyses for PCBs were then conducted on the oils to determine appropriate disposal procedures.

A DD signed by NMED in September 1994 approved the recommendation for excavation and off-site disposal of TRPH- and polychlorinated biphenyl (PCB)-contaminated soil. The RA was completed and the site was approved for closure in 1996.

C1-2.12 SS-12–FUEL LINE SPILL SITE NO. 1 (AOC-K)

In 1975, approximately 2,000 gallons of JP-4 fuel was spilled in the area just northeast of the Main Base housing complex. The spill resulted from a ruptured fuel line due to excessive line pressure. The JP-4 was collected in a pit and pumped into a tank truck. The majority of the fuel was recovered. The spill area was located 500 feet from the base boundary and less than 50 feet from the nearest surface drainage ditch.

A PA/SI was conducted by Radian in 1993. Three wells and six borings were completed. Samples were analyzed for EPA modified Method 8015, and little to nothing was detected. However, soil below the saturated interval was stained, so NMED required additional investigation to confirm that no release has occurred at this site. The additional RI was completed in 1995. The DD signed by NMED in September 1995 indicated that the SI conducted at the site indicates that no action is necessary to protect human health and the environment and the site was approved for closure in November 1995.

C1-2.13 SS-13–SODIUM ARSENITE SPILL SITE (AOC-J)

The Sodium Arsenite Spill Site is located in the Civil and Engineering Complex next to the DRMO storage facility. A total of eighty 30-gallon containers of sodium arsenite, a weed killer, were being stored at this location in 1979. The herbicide was being applied to the subsoils underlying an area of new runway construction. In August of 1979, the Base Bioenvironmental Engineer surveyed the storage area and found that one of the cans was empty and had a hole in the bottom. All cans of herbicide not needed on Base were removed from this site.

The CH2M Hill 1983 Phase I Records Search reported that the release had occurred and that site cleanup operations could not be confirmed (overall HARM score of 45). One soil boring and one monitoring well were installed at the site for the 1987 Dames and Moore Phase II Stage I study. Groundwater occurs at 15 feet BGL with the hydraulic gradient towards the south.

Based on the low levels of arsenic found at the site, the study recommends no further action. The 1993 DD concluded that this site does not present significant threat to the environment; therefore, the No Action alternative recommendation was approved and the DD for closure signed by NMED in April 1993.

C1-2.14 OT-14–FORMER ENTOMOLOGY SHOP AREA (SWMU 197)

The Former Entomology Shop Area was located in Building 67. From 1968 to 1977, pesticide spraying and washing equipment was rinsed out in an open area adjacent to Building 66 inside the Civil Engineering Yard. In addition, pesticide mixing and drum storage occurred at this site. The pesticides were solubilized using diesel fuel. The area involved is less than one-quarter of an acre.

The site topography is flat with stratigraphy consisting mainly of silty sands. Groundwater was found at 15 feet BGL in a unconfined aquifer. Groundwater flows toward the south-southwest.

In July 1977, soil samples were collected from the rinse area and showed the presence of several persistent pesticides at low levels. As a result of these analyses, the soils in the disposal area were treated with lime and powdered charcoal. The top 6-8 inches of soil were then tilled.

This site was first described in the 1983 Records Search conducted by CH2M Hill (overall HARM score of 43). Five soil borings and four monitoring wells were installed at this site for the Radian 1992 RI. Soils showed fairly significant contamination with the pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, and chlordane. Groundwater did not appear to be significantly affected by the operations conducted at the Former Entomology Shop Area.

An FS was completed in December 1993 and recommended an asphalt cap to mitigate risk to human health through dermal exposure and inhalation. A remedial design was conducted. The selected remedy was approved in the DD signed by NMED in September 1995. The RA consisted of installation of an asphalt cap with an impermeable liner over affected soils, installation of stanchions to restrict site access, and annual inspection and maintenance of the cap. The installation was completed in November 1996 and the site approved for closure.

C1-2.15 SD-15–REFRIGERATION/HEAT SHOP WASHRACK (SWMU 80)

The Refrigeration/Heat Shop Washrack is a small area (approximately 50 square feet) located in the Civil Engineering Complex. For the period of 1971 to 1981, a sulfuric acid solution was utilized to de-scale cooling system equipment. The rinse water was discharged to a septic tank drain field. The washrack is located 2,200 feet from the Base boundary and less than 25 feet to the near surface drainage ditch. Groundwater occurs at 15 feet BGL at this site. The hydraulic gradient is towards the south.

A PA/SI was conducted in FY 95. The site did not contain detectable concentrations of petroleum-related constituents in soil or water. There is no evidence of a release to soil or groundwater of wastes associated with the washrack, with the exception of the pH value of 5.75 in SB-01 at 6 to 8 feet, which may be related to past discharges of sulfuric acid. No Further Action was recommended for this Site, and a DD for closure was signed by NMED in September 1996.

C1-2.16 OT-16–EXISTING ENTOMOLOGY SHOP AREA (AOC-A, SWMUS 118 AND 132)

The Existing Entomology Shop Area was located in Building 21 in the Civil Engineering Complex and is approximately one-half acre in size (Building 21 has since been demolished; consequently, this actually is no longer the existing entomology shop). From 1977 to 1988, rinse waters produced from washing the mixing equipment was discharged to a pit/boring on the northwest side of the building. In 1988, the discharge was sent into the Base sewer system. Another potential source of contamination was a pesticide collection pit located on the southwest side of Building 21. This was used during pesticide mixing activities and was designed to capture any pesticides lost down the drain during mixing activities.

Topography in this area is flat, the site is covered with gravel and there is no vegetation. The site stratigraphy consists of mainly coarse to fine grained silty sand. Groundwater is located approximately 15 feet BGL in an unconfined aquifer. Groundwater flows to the southwest toward Dillard Draw.

The 1983 CH2M Hill Phase I Records Search first described this site (overall HARM score of 43). One soil boring was drilled and four monitoring wells were installed at this site for the 1992 Radian RI. Pesticides and volatile organic compounds were detected in the soil and groundwater samples.

For the Phase II investigation, five soil borings were drilled at SWMU 118, four soil borings were drilled at SWMU 132, eight soil borings were drilled around the former Building 21 generator slabs, and six hand auger samples were collected at the former transformer pad. To investigate groundwater, samples for laboratory analysis were collected from the four existing monitor wells and from seven temporary sampling points using the Geoprobe.

Analytical results indicate that:

- PCBs are above trigger criteria in samples from two locations at SWMU 132;
- TRPH are above trigger criteria in two samples from 2-4 feet beneath the generator pads;
- Heptachlor epoxide is above trigger criteria in one surface soil sample from SWMU 118; and
- Heptachlor epoxide and gamma-BHC are above trigger criteria in several groundwater samples, including some samples from wells upgradient of Building 21.

The risk assessment for ERP Site OT-16 was updated and indicates that the constituents detected in soil do not pose a risk to human health or the environment. The risk assessment was not updated for groundwater because it has been determined that there are no complete pathways for groundwater at Holloman AFB and the assessment indicated that groundwater contamination at the site does not pose a risk to human health or the environment.

Conditional No Further Action was recommended with the condition being to remove TRPH-contaminated soil. Contaminated soil which exceeded the 1,000 mg/kg TRPH NMED cleanup level was excavated and disposed off site in 1997. Long-term groundwater monitoring is being performed through FY 2007. A DD was signed by the Base for Site OT-16 in FY 2000 and the site closed.

C1-2.17 SS-17-BASE EXCHANGE (BX) SERVICE STATION FUEL LEAK AREA (AOC Q)

(Not on RCRA Permit)

The BX Service Station is located in a densely populated portion of the Main Base Area near the hospital. The station occupies approximately one and one-half acres and had five underground storage tanks (USTs). The service station has been in its present location since the early 1950s, some of the USTs had been in use for more than 20 years. All USTs have now been removed from the site.

In January 1981, discrepancies in the MOGAS inventories were noted. Excavation of the area showed that fuel had been leaking into the groundwater through two corroded tanks and several fuel lines. An estimated 100,000 to 150,000 gallons of MOGAS had leaked from the fuel system. A DPM score of 10 was assigned to this site.

The site stratigraphy consists of sands, sandy silts, and clay. The area is relatively flat, sloping gently to the south. Groundwater is located approximately 4 to 15 feet BGL in a unconfined aquifer. Groundwater flow is to the south.

Monitoring wells drilled around the station indicated that fuel was floating on top of the shallow groundwater table. High levels of hydrocarbons were found in the groundwater. Recovery wells were drilled and a total of 5,500 gallons of liquids (95 percent water) were pumped out. The Phase I evaluation (CH2M Hill, 1983) identified the BX Service Station as the site at Holloman AFB with the highest potential for environmental impact (overall HARM score of 66). There was a serious safety concern over possible ignition and explosion of gasoline should it seep into sewer lines. A Phase II investigation (Dames & Moore, 1986) included the installation of 29 monitoring wells around the site. It was estimated that 71,000 gallons of free product remained in the subsurface. In 1987, EPA's Environmental Monitoring System Laboratory conducted geophysical and soil vapor surveys at this site to further define the extent of contamination. Also in 1987, recovery operations were resumed using three recovery wells and two recovery trenches. Approximately 14,500 gallons of gasoline were recovered. Recovery operations were stopped at the end of 1987. Two more trenches were added in 1989 as part of a RI (Walk, Haydel and Associates, 1989) and recovery operations recommenced. At present, measurable free product has been removed from the subsurface. Underground fuel lines have recently been replaced with fiberglass to prevent further leakage caused by corroded steel pipe. In March 1995 a small spill occurred when a pipe joint connecting the underground lines to a dispenser leaked. The pipe joints were replaced. A tank pressure testing program had been implemented for the aboveground tanks. No underground tanks are present at this site.

An SVE system was constructed at Site SS-17 and began operation in September 1995. The SVE system consists of 22 extraction trenches/wells and a skid-mounted vacuum pump and hydrocarbon vapor thermal destruction unit. A DD was signed by NMED in September 1996. The system was expected to remediate TRPH-contaminated soils to below the NMED 1,000 mg/kg standard by 2001, however, due to remaining hot spots, remediation is expected to continue until closure in FY 2005 with long term monitoring through 2006.

C1-2.18 SS-18--CHROMIC ACID SPILL SITE (AOC-H)

The Chromic Acid Spill Site is located near Building 281 in the Main Base Area. The 479th CRS maintained a chrome plating shop in Building 281 until the late 1970s. When the operation was discontinued, the full chromic acid vats were temporarily stored on the south side of the building. It is estimated that approximately 500 gallons of chromic acid were spilled on the ground in this storage area with some of the acid reaching the surface drainage ditch just west of the storage area. Groundwater occurs approximately 15 feet BGL at this site. The hydraulic gradient is towards the south.

In 1982, 10 yellow-stained soil samples were collected and composited for hexavalent chromium analysis. The RCRA characteristic (EP Toxicity) quantity of hexavalent chromium found in the composite sample extract was 0.600 mg/L.

The 1983 CH2M Hill Records Search concluded that the site is not considered to present a significant concern for adverse effects on the health or the environment. However, Dames and Moore investigated Site SS-18 for the March 1987 Phase II Stage I study, installing one monitoring well and drilling one soil boring. No chromium was found in the soil, and very low levels were found in the groundwater. The study recommended No Further Action for Site SS-18. The 1993 DD concluded that this site does not pose any significant threat to public health or the environment. Therefore, the recommended No Action alternative was approved in the DD signed by NMED in April 1993.

C1-2.19 LF-19--GOLF COURSE LANDFILL (SWMU 105)

The Golf Course Landfill is located south of the golf course and approximately 800 feet north of the Base boundary. It was operated for roughly 10 years from 1968 to 1978. The "landfill" is primarily a dumpsite in various locations across a two-acre area. Primarily golf course grass clippings were dumped at this site; however, some disposal of unused rodenticides also occurred.

The topography of the site gently slopes to the southeast. A drainage ditch cuts through the site. Site stratigraphy consists mainly of sand and silty sand, with some clay lenses. Groundwater occurs approximately 5 to 10 feet BGL in an unconfined aquifer. Groundwater flow is to the south.

The Golf Course Landfill was first described in the 1983 CH2M Hill Records Search (overall HARM score of 37). Three monitoring wells were installed for the 1992 Radian RI. It appears that the suspected wastes at the Golf Course Landfill have not impacted the groundwater. No pesticides were detected in the groundwater. Soil samples were not collected for chemical analysis.

The DD signed by NMED in September 1994 concluded that this site does not pose a significant threat to public health or the environment and therefore was recommended and approved for site closeout with long-term groundwater monitoring through FY 2005.

C1-2.20 OT-20–WASTEWATER TREATMENT PLANT GRIT BURIAL SITE (SWMU 113A)

Historically, all settled solids from the grit chamber located at the head of the sewage treatment lagoons have been buried in excavation pits just east of the fence surrounding the treatment system. It is possible that small amounts of solvents and heavy metals may have been associated with the grit materials. The pits were estimated to be approximately 2 feet wide and 40 feet long. Of the three pits identified, the two shallowest are one to two feet deep and the deepest pit is over eight feet deep.

Site topography is gently sloping to the southeast toward the golf course. Little vegetation was noted in the area. The soils consist mainly of sandy silts. Groundwater conditions are similar to those found at Site WP-49 (sewage lagoons). Groundwater occurs 7 feet BGL at this site. The hydraulic gradient at this site is towards the southwest.

This site was first described in the 1983 Phase I Records Search conducted by CH2M Hill (overall HARM score of 33). Three pits were identified in the 1992 Radian RI; the two shallowest are one to two feet deep and the deepest pit is over eight feet deep. Three borings were drilled into the pits for the RI. Samples collected from the waste contained elevated levels of metals, PCB-1254, several organochlorine pesticides, and dicamba. No monitoring wells were installed. The DD signed by NMED in September 1995 concluded that no action was necessary to protect human health and the environment.

C1-2.21 LF-21--WEST AREA LANDFILL NO. 2 (SWMU 116)

The West Area Landfill No. 2 is located east of the Solar Observatory. The landfill covered an area of one to two acres and was active from the early 1970s (assumed) until 1977. Bioenvironmental Engineering records indicate that waste materials contained at the site included paper bags, food cans, boxes, boards, and tree limbs. One interviewee also indicated that some 55-gallon drums were observed during the active period of the landfill. Disposal operations were stopped after the site was identified as an unapproved landfill site. This landfill is located 800 feet from the nearest drainage ditch.

The topography of the area is relatively flat, sloping gently from northeast to southwest with surface drainage following this trend. Site stratigraphy consists of sand and silty sand. Groundwater is located at 8 to 12 feet BGL in an unconfined aquifer. Groundwater flows southwest.

The site was first identified in the 1983 Phase I Records Search conducted by CH2M Hill. Four monitoring wells were installed for the 1992 Radian RI. Volatile organic compounds were detected in the groundwater as well as high levels of cadmium. No chemical analysis has been performed on soil samples.

Site closeout with long-term monitoring through FY 2005 was recommended and approved for this site in the DD signed by NMED in September 1994.

C1-2.22 LF-22--WEST AREA LANDFILL NO. 1 (SWMU 115)

The West Area Landfill No. 1 was located in an arroyo near the Solar Observatory, Building 910. The landfill covered a two to three acre area and was used during the years of 1974 to 1978. A December 28, 1978 memo in the Bioenvironmental Engineer's pollution file describes the landfill site and indicates that items such as plastic sheets, boxes, and empty cans were the types of solid wastes disposed of at the site. Disposal operations were stopped after the location was identified as an unapproved landfill site. One interviewee indicated that some 55-gallon drums were observed during the active period of the landfill.

The landfill is located in a basin where the topography is fairly flat. The stratigraphy of the site mostly consists of a well-sorted, fine-grained sand. Groundwater occurs in a shallow unconfined aquifer beneath the site approximately 12 feet BGL. Groundwater flow direction is to the west-southwest.

The site was first identified in the 1983 Phase I Records Search conducted by CH2M Hill. Four monitoring wells were installed for the 1992 Radian RI. No contaminant was discovered in high enough levels to consider remedial action. However, extremely low levels of the pesticide alpha-BHC were discovered.

Site closeout with long-term groundwater monitoring through FY 2005 was recommended and approved for this site in the DD signed by NMED in September 1994.

C1-2.23 LF-23--MOBSS LANDFILL (SWMU 108)

The 4449th MOBSS Landfill is located in a borrow pit west of the Solar Observatory covering approximately one acre, and received waste disposal items from 1976 to 1979. Cans of diazinon, dibromochloromethane, and 55-gallon drums of unknown contents were reportedly observed at the disposal site. Asphalt, construction debris, a concrete vault, a trailer, two to three empty 55-gallon drums, four to five 1-gallon metal buckets with roofing tar, and other materials were found at the dumpsite.

The area has gently sloping terrain. The stratigraphy of the site consists mainly of silty sand with a large silty clay lens. Groundwater occurs at approximately 10 feet BGL and flows to the southwest.

This site was first described in the 1983 Records Search conducted by CH2M Hill (overall HARM score of 41). Radian installed four monitoring wells for the 1992 RI. Delta-BHC was detected in the groundwater in low quantities. Cadmium was also detected in the groundwater. No soil samples were collected for chemical analysis.

Site closeout with long-term groundwater monitoring through FY 2014 was recommended and approved for this site in the DD signed by NMED in September 1994.

C1-2.24 OT-24–FORMER EQUIPMENT MAINTENANCE AREA (SWMU 134)

The Former Equipment Maintenance Area is located in the West Base Area in Buildings 920 to 924. The buildings are located in a row on the west side of Hale Drive. This site covers about 14 acres. Waste solvents, cleaners, and oils from the industrial operations located in these buildings during 1959 to 1970 may have been discharged to the septic tanks that serviced the area. After this period Buildings 920 to 922 were used mainly for storage while industrial operations continued in Buildings 923 and 924. Two drainage ditches are located near the facility, however they are located over 300 feet from the buildings and showed no evidence of waste disposal.

The topography of the site slopes very gently to the southwest. There is a berm to the east separating the site from the MOBSS facility. Site vegetation consists mainly of grasses and sagebrush. The site stratigraphy consists of three distinct units: the upper unit consists of silts interbedded with sands, the middle consists of clean sand, and the lower unit consists of clay. Groundwater occurs approximately 12 to 14 feet BGL. Groundwater flows toward the south.

The site was first reviewed in the 1983 Records Search conducted by CH2M Hill (overall HARM score of 40). Six monitoring wells were installed for the 1992 Radian RI. There does not appear that there were hazardous releases to the groundwater from the operations at this site. No soil samples were collected for chemical analysis.

Further investigation of this site has been conducted in the Phase II Table 1 RFI to satisfy EPA Region VI concerns regarding benzene, toluene, ethylbenzene, and xylene (BTEX) contamination in two monitoring wells at the site. The results of the Phase II Table 1 RFI concentrations of BTEX in the two monitoring wells were not confirmed. OT-24 is recommended for No Further Action; DD for closure with NFA was signed by the Base in FY 2000.

C1-2.25 SD-25–POSSIBLE DRAINAGE LAGOON DISPOSAL SITE (SWMU 166)

The drainage lagoon receives surface runoff from the MOBSS area (Buildings 901 and 902). According to one interviewee, outdated chemicals such as pesticides, high-test hypochlorite (HTH), and solvents have been disposed of in the drainage lagoon from around 1977. During the base tour, three 55-gallon drums of unknown chemicals were observed by the edge of the lagoon. Visual inspection of the lagoon did not reveal any signs of POL waste disposal. The hydraulic gradient is toward the south.

The 1983 Phase I Records Search (CH2M Hill) concluded that Site SD-25 posed minimal environmental harm because there was no evidence of contamination, and further investigation was not warranted (overall HARM score of 38). However, RI activities were conducted by Walk, Haydel and Associates, Inc. for the 1989 report because a military construction project was planned for the area. Two sediment and two surface water samples were collected. The samples were analyzed for volatile organic and semivolatile organic compounds, pesticides, PCBs, TRPH, and metals. Two soil borings were hand-augered for soil samples. According to the RI, no significant levels of contaminants were found in any of the samples collected. Groundwater occurs 10 feet BGL at this site.

The 1993 DD recommended No Further Action, concluding Site SD-25 posed no significant threat to human health and the environment and was signed by NMED in April 1993.

C1-2.26 SS-26–POSSIBLE MISSILE FUEL SPILL SITE (AOC-D)

The Possible Missile Fuel Spill Site is located just south of Pad 8, near Building 882. The Navy utilized this area during 1976 for missile testing. It was reported that waste fuels from these tests were disposed of on the ground just south of Pad 8. Potential sites were identified on the barren field south of Pad 8 and Building 887 (approximately two acres in size) and the Hot Mix Shoulders located north and south of the taxiway to Pad 8 (approximately one-half acre).

The site topography is relatively flat. The stratigraphy consists of three identifiable units. The uppermost unit consists of silty sand, which becomes more fine grained to the north (silty clay). The middle unit is a fine-grained sand. The lowest unit is composed of fine-grained silty sand that grades into silt to the south. Groundwater is located approximately 5 feet BGL and flows to the southwest.

The 1983 Records Search (CH2M Hill) first described this site (overall HARM score of 33). Since the location of the spill was uncertain, a soil gas survey was conducted at the site for the Radian 1992 RI. In addition, four soil borings were drilled and four monitoring wells were installed. No contaminants were conclusively found during the soil gas survey, or in the soil or groundwater samples.

The DD recommended site closeout for this site, which was approved and signed by NMED in September 1994.

C1-2.27 SD-27–PAD 9 WASHRACK AREA (SWMU 141)

The Pad 9 Washrack Area is located west of the Main Base Area near the runways and is approximately one acre in size. According to civilian Air Force employees, the washrack was utilized to wash down drones and manned aircraft that had flown through clouds of nuclear blast materials in the late 1940s and early 1950s. All drainage from the wash was sent to a sump and associated drainfield/pit. There are no sanitary sewer lines to the area; therefore, any radioactive materials washed off the aircraft would still be located in the sump or the surrounding area. Groundwater occurs 5 feet BGL. The hydraulic gradient is towards the west.

In May 1976, radiation measurements were obtained from the sump and soil samples were collected and submitted for analysis. All readings and analysis indicated that there were no radiation levels detected above normal background.

In 1993, a PA/SI was conducted by Radian. A total of four borings were placed around the site. Stained soil was detected in the saturated soil beneath the backfill in the pit east of the washrack; however, no concentrations of contaminants above risk-based levels were detected in soil above the water table. SD-27 was recommended for No Further Action. A DD for this site is pending.

C1-2.28 SD-28–FORMER NORTH AREA WASHRACK (SWMU 112)

During the 1950s, this washrack was the main wash area for vehicles and equipment located in the North Base Area. Oils, detergents, and possibly some fuels were washed off the rack area and allowed to drain into the surrounding soils. This site is small, less than one-quarter acre.

The site is generally flat with little or no vegetation. Site stratigraphy consists mainly of silty sand. Lenses of silt and clayey sand are found in the sand. Groundwater occurs approximately 20 feet BGL. Groundwater flow is to the west toward the Lost River drainage basin.

The site is first described in the 1983 Records Search conducted by CH2M Hill (overall HARM score of 36). Two soil borings were drilled and three monitoring wells were installed for the Radian 1992 RI. A few volatile organic compounds were found in the groundwater and soil but not high enough levels to warrant remediation. Site closeout was recommended and approved for this site in the DD signed by NMED in September 1994.

C1-2.29 LF-29–FORMER ARMY LANDFILL (SWMU 104)

From the early 1950s to 1975, spent munitions and missiles were disposed of by the Army at this site located near the North Base Building Area. The contents appear to be primarily construction debris, but munitions and other wastes may be present. Its boundaries are defined by a small berm that extends 400 feet north-south and 350 feet east-west (approximately three acres). However, materials may have been dumped outside the berm along the southern border.

The site slopes gently to the southwest and site vegetation consists mainly of grasses and bushes. The stratigraphy of the site consists of four broadly defined units. The uppermost consists of a fine-grained silty sand. A clay unit underlies the sand. Beneath the clay unit is a sand and silty sand layer. The lowermost unit consists of silt and clay deposits. Groundwater occurs in an unconfined aquifer about 20 feet BGL. Groundwater flows to the northeast to the Lost River drainage basin.

This site was first described in the 1983 Records Search (CH2M Hill) which did not give it a hazard ranking. Four monitoring wells were installed at this site for the 1992 Radian RI. The Former Army Landfill's effect on groundwater is minimal. Only low levels of 4,4'-DDD and chloroform were detected (in one well). Soil samples were not collected for chemical analysis.

Further investigation of this site was conducted to better evaluate downgradient groundwater conditions. A total of four new monitoring wells were installed as part of the Phase II Table 1 RFI. Low levels of contaminants were detected downgradient of the site; however, benzene detected in an upgradient well indicates that a contamination source may be located upgradient of Site LF-29. The site was subsequently closed with No Further Action and long-term monitoring. A DD for this site is pending.

C1-2.30 DP-30--GREASE TRAP DISPOSAL PITS (SWMU 113)

The Grease Trap Disposal Pits (trenches) are located west of the FPTA. A pit active in 1992 was approximately 5 feet wide, 10 feet deep, and 50 feet long. Former disposal pit sites were identified north of the active pit. The trenches cover an area of about 2 acres (including the Cooking Grease Disposal Trenches [SD-33]). Initially, the Grease Trap Disposal Area was separate from the Cooking Grease Disposal Trenches. Over time, the sites were enlarged so that their borders appear to have merged. The two sites now cannot be distinguished from each other.

Beginning in 1972, shallow trenches were dug and reportedly received wastes from Base grease traps, oil/water separators, and grit from the wastewater treatment system. One interviewee indicated that quantities of various pesticides were also disposed of here, but this could not be verified. Personnel from Exterior Plumbing indicated that occasionally sewage from the Primate Research Lab was dumped into these pits. The Water and Wastewater Department used the area for grit disposal prior to 1988. Oil/water separator sludge disposal occurred at these pits from 1980 to 1988.

Groundwater occurs at 25 feet BGL with the hydraulic gradient towards the southeast. The terrain of the site is fairly flat and the soil is covered with sparse vegetation. The stratigraphy of the site is a complex interfingering of silty sand, silt, and clay. The groundwater level is approximately 20 feet BGL in an unconfined aquifer with the hydraulic gradient down to the southeast toward Dillard Draw.

The Phase I Records Search (CH2M Hill, 1983) first described this site (overall HARM score of 43). A hydrogeological investigation was undertaken for the site in the 1992 Radian RI. Ten waste pits were identified through exploratory trenches. Ten soil borings were drilled, one for each pit. In addition, 4 monitoring wells were installed, one upgradient and three down gradient. Soil/waste and groundwater samples were analyzed for metal and organic constituents. Elevated levels of metals (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) were detected in the soil/waste samples. Significant levels of oil and grease, organochlorine pesticides, PCBs, chlorinated herbicides, and volatile organics were detected in the soil/waste samples. Although some semivolatile organics were detected in the soil waste, their concentrations were near or below detection levels.

The groundwater quality does appear to be significantly impacted by the disposal site. Elevated levels of sulfate and nitrate/nitrate were present in the samples collected from the monitoring wells. Two metals (beryllium and selenium) were detected in relatively elevated levels. All results are presumably at or near background levels.

No risk was found at this site; therefore, No Further Action was recommended and approved in the DD signed by NMED in September 1995. The site was approved for closure with long-term monitoring of groundwater through FY 2007.

C1-2.31 FT-31--FIRE PROTECTION TRAINING AREA (SWMUS 39, 127, 135, 170, AND 171)

The Fire Protection Training Area, Site FT-31, is located north of the Main Base Area and west of the current Main Base Landfill. It is the only identified site of fire department training on the Base and has been located in the same general area since the Base was activated. The area currently consists of a circular, gravel-lined region where a mock aircraft is located. The runoff from training exercises was collected in an oil/water separator (installed in 1980) prior to discharge to an open pit. Groundwater occurs 25 feet BGL with the hydraulic gradient towards the southeast.

Up until 1979, waste oils, solvents, and fuels were delivered to the FPTA from all major industrial shops. The flammable liquids were sprayed on the mock aircraft and ignited for the training exercise. Since 1979, only new fuel has been used in fire department training exercises.

Training exercises included pre-soaking the area with water prior to fuel application and ignition. Fuels used for igniting fires were stored in an underground steel tank near the site. Most of the ignition materials are consumed in the fires; however, some percolation of these materials into the groundwater occurred.

The 1983 Phase I Records Search (CH2M Hill) concluded that percolation of waste fuel and solvents into the groundwater was inevitable; therefore, further investigation was recommended (overall HARM score of 44).

The 1987 Phase II Stage I investigation (Dames & Moore) of this site consisted of installation of one monitoring well and two soil borings. This study concluded that Site FT-31 had low levels of contamination and recommended further study.

The 1989 RI conducted by Walk, Haydel and Associates, Inc. for this site consisted of a soil vapor survey, the installation of seven monitoring wells, the drilling of two borings, and the collection of four sediment samples. The RI report concluded that extensive soil and water contamination was found in the oil/water separator area and recommended that the separator be removed.

NMED however, requested further investigation of the site. A Phase I RFI was conducted on SWMUs 39, 127, and 135 (Table 2), and an additional investigation was conducted at SWMUs 170 and 171 as part of the Table 1 Phase II RFI. The investigation further delineated TRPH-contaminated soils. A bioventing system was constructed at SWMUs 39, 127, 135, and 170 and the TP-4 tank area in June 1996. The system was expected to remediate TRPH-contaminated soils by the end of FY 2002, however remaining hot spots require remediation to continue. Closure is anticipated in FY 2004 with LTM through FY 2007.

C1-2.32 OT-32–SEWER LINES FROM THE PRIMATE RESEARCH LABORATORY (SWMU PRI-A)

Approximately 3,000 to 4,000 feet of sewer lines from the Primate Research Laboratory were suspected of being corroded, with certain portions thought to be totally collapsed from the early 1960s to 1981 when the lines were repaired. During the period when the lines were badly corroded/collapsed, quantities of carbon-14, iodine, and tritium tracers as well as solvents were suspected of leaking into the soil. The quantities of solvents and radioactive isotopes utilized by the facility is small; however, no specific information was available as to the amounts of these materials that could have entered the shallow groundwater which occurs approximately 35 feet BGL.

The 1983 Phase I study by CH2M Hill concluded that site OT-32 was not considered to present a significant concern for adverse effects on health or the environment (overall HARM score of 45).

Dames and Moore conducted a Phase II, Stage I study (1987) at this site, drilling four borings, and analyzing the samples for oil and grease, TOX, tritium, and carbon-14. Because very low levels of contamination were found, the study recommended No Further Action for Site OT-32.

The 1993 DD states that the site does not pose a significant threat to human health and the environment. Therefore, the document concluded that further investigation or remedial measures are not appropriate and DD recommending site closeout was signed by NMED in April 1993.

C1-2.33 SD-33–COOKING GREASE DISPOSAL PITS (SWMU 113)

During the helicopter overflight conducted at the Base for the Phase I Records Search (CH2M Hill, 1983), survey team members observed several shallow trenches located north and west of the FPTA. Bioenvironmental Engineering personnel identified these trenches as being the disposal site for cooking greases from base kitchens. This site is juxtaposed to the Grease Trap Disposal Area. The Cooking Grease Disposal Area borders are difficult to distinguish from the Grease Trap Disposal Area. Therefore, a general description of both sites is covered in Section C1-2.30 in this Appendix (Grease Trap Disposal Area).

Groundwater occurs 25 feet BGL with the hydraulic gradient towards the southeast.

The 1983 CH2M Hill Phase I Records Search first described this site, but no hazard ranking was assigned. The 1992 Radian RI investigated this site, combining it with the Grease Trap Disposal Area. The DD signed by NMED in September 1995 recommended that no action was necessary to protect human health and the environment. The No Action alternative was approved and as part of the No-Action remedy, a long-term monitoring program was initiated which will continue through FY 2004.

C1-2.34 OT-34–SPENT MUNITIONS BURIAL SITE

Excavation pits are utilized for the disposal of all spent munitions rounds detonated by the Explosive Ordnance Division (EOD). The pits are examined carefully to ensure no live rounds of ammunition are contained in them prior to backfilling.

Groundwater occurs approximately 60 feet BGL with the hydraulic gradient towards the west.

The 1983 CH2M Hill Records Search concluded that conditions at the site pose no significant threat to public health and the environment. Therefore, no hazard ranking was performed on Site OT-34. The study also recommended land-use restrictions for the site.

The 1993 DD agreed with the finding, recommending that no further investigation or remedial measures be considered and the site closed out under the ERP. The DD recommending the No Action alternative for this site was signed by NMED in April 1993.

C1-2.35 OT-35–SPENT SOLVENT DISPOSAL AREA (SWMU PRI-5)

One interviewee indicated that spent solvents and radioactive tracers were disposed of on the ground near the Central Inertia Guidance Test Facility and ignited. This disposal practice was said to have occurred intermittently since the 1950s. The disposal and burning of the solvents and tracers at this site could not be verified by the other interviewees.

A PA/SI was conducted by Radian in 1993. Three soil borings were installed at potential disposal areas. A soil gas survey was conducted before that time to locate soil borings. Nothing was detected at the site, and the DD recommending No Further Action was signed by NMED in September 1995.

C1-2.36 SS-36–UNCONVENTIONAL FUELS AREA SPILL SITE (SWMUS 129 AND 178)

The Unconventional Fuels Area Spill Site is located in the Supply LOX (liquid oxygen) Area near Buildings 1191 (former Oxidizer Storage Area) and 1192 (former Propellant Storage Area). The fuels handled at this area included unsymmetrical dimethylhydrazine (UDMH), JP-4, inhibited red fuming nitric acid (IRFNA), and aniline. The JP-4 and UDMH are mixed together in a 1:1 ratio to form the liquid propellant JPX. The Supply LOX Area stores, mixes, and transports IRFNA and JPX to the test track. Propellant grade UDMH is received on transporters and stored in these containers until issued.

Buildings 1191 and 1192 have a total of four runoff pits that received all spilled fuels and floor washings from the concrete pad storage and mixing areas. The records indicate that all the runoff pits were replaced with new tanks. The old pits were filled with concrete and abandoned.

Across the street and to the west is the site of the former First Acid Storage Area. The former Aniline Storage Area is located in Building 1112 just east of Building 1192. This site is spread out over approximately 50 acres.

Topography of the site is relatively flat. Four geologic units were broadly defined at Site SS-36. The uppermost unit consists of 7 to 10 feet of silt and silty sands. Underlying the uppermost unit is clay interbedded with silt. Beneath the clay lies fine-grained sands interbedded with silts. The lowest unit encountered is a clay.

Groundwater occurs in an unconfined (or possibly a semi-confined) aquifer at approximately 26 feet BGL. Groundwater flows to the west-northwest toward the Lost River drainage basin.

In March 1979, soil samples were randomly collected from areas known to have received UDMH runoff from the fuel storage area. The results of these analyses indicated that no UDMH was present in former spill sites. In June 1981, soil samples were obtained from the fuel disposal pits and analyzed for hydrazine, fluoride, nitrate, and aniline. No significant levels of waste fuels were detected in any of the soil samples.

The site was first described in the 1983 CH2M Hill Records Search (overall HARM score of 42). For the 1992 Radian RI, five monitoring wells were installed around the site. Groundwater sampling results showed a low level of trichloroethene (TCE) resulting from site operations. No soil samples were collected for chemical analysis.

The scope of the Phase I investigation was not sufficient to fully characterize the site, since no soil samples were collected and groundwater flowed in a different direction than anticipated; so further investigation was recommended.

For the 1992 RI investigation, an electromagnetic (EM) survey and trenching were used to locate three sumps south of Building 1192. A similar structure was expected to be found south of Building 1191; however, it was not located. Existing information indicates that this tank was removed in 1986. Soil borings were drilled adjacent to each of the sumps, in four locations around Building 1112, the former aniline storage area, and in five locations in the former first acid storage area. Monitor wells were installed downgradient (west) of each of the suspected areas.

Analytical results indicate the presence of elevated levels of TRPH in two locations, and elevated levels of lead in one of the drains at the former first acid storage area. The elevated lead is probably attributable to the metal drains themselves. No other constituents were detected at concentrations exceeding trigger criteria. Risk assessment results indicate that the site does not pose an unacceptable risk to human health or the environment.

Conditional No Further Action was recommended, the condition being the removal of TRPH-contaminated soils exceeding the 1,000 ppm TRPH action level established by the NMED. The contaminated soil was excavated on 17 and 18 July 1995 during the POL Removal Phase I Project. Signature of a DD recommending No Further Action and site closure is pending.

C1-2.37 OT-37–EARLY MISSILE TESTING SITE (AOC-L)

The Early Missile Testing Site was utilized from 1947 to 1955 and is located east of the Test Sled Maintenance area. This site consists of several facilities spread out over approximately 80 acres. Rockets thought to have been tested here include the V-2 rocket. Solid fuel propellants were thought to have been primarily utilized including nitrocellulose, nitroglycerine, polysulfide, potassium perchlorate, and polysulfide. Waste products thought to have been spilled at the site as a result of these fuels include lead oxide, nitrate compounds, and hydrochloric and sulfuric acids. Areas of concern at Site OT-37 include the fueling/staging area at the base of the inclined track, the outfall for the drainpipe from the inclined track, the three launch facilities (each launch facility consists of a vertical launch pad and a blockhouse), the large pit northwest of Blockhouse 1142, and four former step-down transformer stations.

The site is located near the edge of the Lost River arroyo. The site geology consists of four broadly defined geological units. The uppermost unit (7 to 10 feet thick) consists of silt and sandy silt. Silt and silty clay (5 to 15 feet thick) underlie the uppermost unit. Beneath this is a (7 to 15 feet) well-sorted fine sand. The lowest unit encountered was a clay to silty clay. Groundwater occurs in an unconfined aquifer from 30 to 35 BGL in sand and basal clay units and flows toward the Lost River drainage basin.

Six soil borings were drilled and six monitoring wells were installed at this site for the 1992 Radian RI. All transformer locations have either petroleum hydrocarbons at concentrations greater than 100 mg/kg, or PCBs in the soil adjacent to the site (9.2 to 3,200 mg/kg). The rest of site appears to have little contamination. One location has petroleum hydrocarbons greater than 1,000 mg/kg, but no volatile organic compounds were found above detection limits.

The ecological risk assessment (Radian, June 1992) for this site indicated no risks. Therefore, the site was recommended and approved for site closeout in the DD signed by NMED in September 1994.

C1-2.38 OT-38–SLED TEST MAINTENANCE AREA (SWMUS 137 AND 138)

From 1951 when the test track area became operational until 1979, waste oils, solvents and paint strippers utilized in the sled industrial maintenance area (Building 1166) were suspected of being discharged to a cesspool behind the building. The cesspool was described as an unlined cavity at least 6 feet deep and 10 feet long. In the late 1980s, a septic tank was installed replacing the cesspool. All waste POL products have been accumulated in 55-gallon drums and turned into DRMO since 1979. This site is small, covering less than one-quarter acre.

The site topography is relatively flat. Site stratigraphy consists mainly of silt or sand. Groundwater is located at approximately 30 feet BGL and flows to the south toward the Lost River drainage basin.

The 1983 Records Search (CH2M Hill) first described this site. Two soil borings were drilled and three monitoring wells were installed at this site in the Radian 1992 RI. The impact of the cesspool and past operations at the site appear to be minimal. Little contamination requiring action was detected in the soil or groundwater. TCE was the only contaminant found in the groundwater that may have been caused by past site operations. Petroleum hydrocarbon concentrations of 1,540 mg/kg were detected in one of the boreholes between 0 and 10 feet BGL.

Site closeout/No Further Action was recommended and approved for this site in a DD signed by NMED in September 1994.

C1-2.39 SS-39–MISSILE FUEL SPILL AREA (SWMUS 165, 177, 179, AND 181)

The Missile Fuel Spill Area consists of the Sled Test Launch Area Collection Basin, the Propellant Spill Drain Discharge Box, the Building 1176 Drainage System, and the drainage system related to the Alpha Pad and Building 1176. These facilities are spread out over an area of about 10 acres. The launch pad at the south end of the track was constructed with concrete drains and a water deluge system. Spilled oxidizers and fuels were delivered to separate drains, diluted with water and flushed into the Lost River. In 1975, catch basins were installed to collect the spilled liquid fuels. Oxidizer vent lines from the engines were also installed and designed to discharge to into the catch basins. Since 1975, no propellants have been intentionally released to the open drains. Waste propellants are currently collected, treated, and disposed of in the treatment system located in Building 1176.

Throughout the history of the test track, fuels have included at least the following: JP-4 (jet fuel); UDMH; aniline; IRFNA; liquid oxygen; JPX; dyes; solid rocket propellants; and other compounds.

In addition to these fuels, solvents such as TCE were commonly used for sled maintenance in Building 1176. The management practices of these chemicals at Building 1176 were not extensively reviewed; however, interviews with past employees suggest that the washrack and drainage trenches could have received wastes.

The site slopes south with small arroyos nearby leading to the Lost River drainage basin. Site stratigraphy consists mainly of well-sorted sand. Groundwater was encountered at approximately 5 feet (relative to the base of the arroyos) to 30 feet BGL (to the north of the arroyos). Groundwater flow is to the south.

Surface and groundwater samples were collected from the Lost River in the vicinity of the test track in July 1979. The results indicated that the test track had no observable impact upon the Lost River water quality.

The site was reviewed in the 1983 Records Search (CH2M Hill). Two soil borings and five hand auger borings were drilled at Site SS-39 for the 1992 Radian RI. In addition, four monitoring wells were installed. Elevated levels of lead and tetrachloroethene were found in the soil. Volatile organic compounds were present in the groundwater.

The results of the remedial investigation indicated that lead and cadmium in soil posed a potential risk to black-tailed jackrabbits. There was no indicated risk to human receptors. The RI Report also indicated that groundwater downgradient of Building 1176 contains TCE.

To address the concerns of the Phase I investigation, for the RI, soil samples were collected from eight borings located along the drainage ditches below the oxidizer and propellant outfalls, two borings at Building 1176 sumps, and five hand-auger borings; groundwater samples were collected from 15 temporary sampling locations using a Geoprobe and screened in the field for chlorinated compounds. Eight groundwater samples were submitted to the laboratory for confirmation analysis. Additionally, surface soil samples, vegetation samples, and jackrabbit tissue, blood, and urine samples were collected in the area, and surface water samples were collected from the Lost River Basin in order to better characterize potential risk to ecological receptors.

Analytical results indicated that there are no constituents, including unconventional fuels, that exceed trigger criteria. In addition, the results of the previous human health risk assessment, together with the updated environmental risk assessment indicated that risks to human and ecological receptors are acceptable for the site. Elevated levels of TCE were detected in the groundwater downgradient of Building 1176; however, the levels decreased significantly with distance from the site. Since groundwater at Holloman AFB is not potable, elevated groundwater constituents do not require remediation unless free product is present. No Further Action with long-term groundwater monitoring is recommended for Site SS-39. A DD closing the site with LTM through FY 2007 is pending.

C1-2.40 LF-40--CAUSEWAY RUBBLE DISPOSAL SITE (SWMU 103)

Concrete rubble was utilized as a Base construction material for the road leading across the Lost River southwest of the test track launch pad. No hazardous waste was known to be associated with the rubble disposal.

The Phase I Records Search (CH2M Hill, 1983) concluded that Site LF-40 posed no significant concern for adverse effects on health or the environment. No hazard ranking was performed for the site. The report recommended the land use of the area be restricted to waste disposal operations. Groundwater occurs 10 feet BGL, and the hydraulic gradient is towards the southwest.

The 1993 DD agreed to this conclusion and recommended that further investigation or remedial measures were not appropriate and this site be closed out under the ERP. Site closeout was approved. The DD was signed by NMED April 1993.

C1-2.41 OT-41–COCO BLOCKHOUSE BOREHOLE DISPOSAL SITE (SWMU 192)

During the mid 1960s, sled launch operations were conducted in the Coco Launch Area on the northern test track area near the Coco Blockhouse. The Coco Launch Area site is about 5 acres in size. It was reported that two 250-foot wells were utilized to separately dispose of any propellants and oxidizers that may have spilled during launch operations. The disposal wells were described by one interviewee as being used very infrequently during this time. One interviewee reported that the wells were located in the two sumps north of the Coco Launch Area while another interviewee thought that the boreholes were located south of the Coco Blockhouse. Although the sumps were found, the locations of the boreholes were never determined even though the area was scanned with a metal detector and a thorough visual search was made.

Site topography slopes to the southwest. The site stratigraphy primarily consists of clean, well-sorted sand. Groundwater occurs approximately 15 feet BGL in sand and silty sand deposits and flows west.

The site was first described in the 1983 CH2M Hill Records Search (overall HARM score of 31). Four boreholes were drilled and a monitoring well was installed in each borehole for the 1992 Radian RI. Relatively elevated levels of petroleum hydrocarbons and metals were found in the soil. However, the impact from past operations on the groundwater at the site appears to be minimal. Therefore, site closeout was recommended and approved for this site in the DD signed by NMED in September 1994.

C1-2.42 RW-42--RADIOACTIVE MATERIAL BURIAL SITE (SWMU 111)

The Radioactive Material Burial Site is located in a remote northeastern area of Holloman AFB. The site was created in the early 1950s and closed during or prior to 1959. The exact type and quantity of radioactive materials disposed of at the site are not known. Suspected wastes include animal carcasses containing low-level radioactivity and contaminated pharmaceutical supplies. The materials are buried in a cylinder 10 feet in length and 5.5 feet in diameter in the center of a fenced enclosure (less than one-half acre in size). The cylinder is buried 2 to 4 feet below grade with a 4-inch thick concrete cover. Periodic measurements and soils analyses have indicated that there have been no radioactive leaks from the cylinder. A site reconnaissance was conducted in February 1991 by Radian. The results showed background radioactivity levels.

The site topography is relatively flat with sparse vegetation. Stratigraphy of the site is expected to be typical of the alluvial, eolian, and playa deposits found in the Tularosa Basin. Groundwater occurs approximately 25 feet BGL.

Periodic monitoring and sampling of the soil by Holloman AFB's Bioenvironmental Engineering indicate that concentrations of radioactive materials present in the site soil are comparable to background locations.

This site was described in the 1983 Records Search (CH2M Hill), but was not given a hazard ranking. A PA/SI was conducted for the 1992 Radian RI. No groundwater samples were collected from this site. A DD recommending site closure was signed in FY 2000.

C1-2.43 DP-43–ATLAS ELECTRICAL SUBSTATIONS (AOC-G)

The Atlas Electrical Substations are located in the northern portion of Holloman AFB near the eastern boundary. There are two substations, one small inactive substation to the north (approximately 2,000 square feet in size) and one large active substation to the south (approximately 11,000 square feet in size).

Until 1979, the standard practice of exterior electric shop personnel was to dispose of transformer insulation oil on the ground in the vicinity of the substation. The current practice (beginning as early as 1974) is to collect, analyze, and turn in all PCB transformer oils to DRMO for appropriate disposal.

The substations are located on relatively flat land that is sparsely vegetated. The uppermost soils at the site are composed of fine grained gypsiferous sands and silts. Groundwater occurs approximately 25 feet BGL.

In 1979, the Base Bioenvironmental Engineer collected samples of the oil-stained soils around the substation and submitted them for PCBs analysis. Due to problems such as container breakage during transit, no analysis was performed. The site was described in the 1983 Records Search (CH2M Hill). Thirty-two locations were sampled for soil at the inactive substation and 49 locations were sampled for soil at the active substation for the 1992 Radian RI. Petroleum hydrocarbons and PCBs were detected in the soil at both substations. No groundwater study was performed.

The DD signed by NMED in September 1994 indicated that No Action was necessary to protect human health and the environment beyond removing TRPH-contaminated soils which exceed the NMED cleanup standard of 1,000 ppm. As recommended, contaminated soils were excavated from the site on 15–17 August 1995. Confirmation samples revealed that TRPH-contaminated soils exceeding the cleanup standard remained at the site, so a second excavation effort to remove contaminated soils was completed in May 1996. A final excavation was completed at the site May 1997 with confirmation samples reflecting less than 1000 ppm. The site was closed in 1997 with no further action planned.

C1-2.44 OT-44–BUILDING 301--AIRCRAFT MAINTENANCE HANGAR (AOC-P)

Building 301 is located in the northern portion of the main Base. Site OT-44 is designated as the area between Building 301, Building 315, and Building 302. The entire area is covered with asphalt and/or concrete. 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). A single 25,000-gallon fiberglass UST has been located on site. An approximately 2 by 40 foot drainage trench is located parallel to the southeast wall of Building 301.

Building 301 is an aircraft hangar used for equipment repair and is located adjacent to the main taxiway. Liquid hydrocarbons were found on the water table during an exploratory excavation for a sewer line. The hydrocarbons are believed to be from one of two sources: oil from aircraft fuel spills on the concrete area west of Building 301, or leakage from an underground heating oil tank which is no longer in service and was located south of Building 301. A corner of a concrete structure thought to be the heating oil tank was unearthed during excavation of a sewer line.

The Phase II Stage I investigation was conducted by Dames and Moore (1987). During the Phase II investigation, one monitoring well and one soil boring were installed and sampled. The Phase II report recommended that the monitoring well be checked for floating product and that the underground fiberglass storage tank be leak tested. If floating product was discovered or if a tank leak was discovered, the drilling of additional soil borings and the installation of additional monitoring wells were recommended.

The site was investigated further by the 1989 RI conducted by Walk, Haydel and Associates, Inc. The Site OT-44 field activities consisted of the drilling of one soil boring and 20 probe holes and the drilling, installation, and sampling of five monitoring wells. Groundwater and soil samples were collected for chemical analysis. Groundwater occurs 15 feet BGL. The hydraulic gradient is towards the south.

The RI report concluded that soil and water contamination are present at Site OT-44. However, the RI stated that the site does not represent an on-site health risk to personnel, but there is a potential for worker exposure to contaminants detected in the subsurface should soil be excavated.

The 1993 DD Report recommended that the Long Term Monitoring alternative be selected because contamination present at Site OT-44 posed no significant risk to human health or the environment. The report concluded that this site be closed out under the ERP. However, NMED requested additional investigation to support that no TRPH exceeds 1,000 mg/kg. Additional investigation was conducted by Foster Wheeler Environmental Corporation as part of the Table 1 Phase II RFI. TRPH concentrations above the 1,000 ppm NMED limit were detected in one of the six borings drilled during the Phase II investigation.

An excavation was completed in April 1997 to remediate TRPH-contaminated soils which exceed the NMED cleanup standard of 1,000 ppm TRPH. The site was recommended for closure in 1998 with long-term monitoring through 2007; DD signing is pending.

C1-2.45 OT-45–OLD AGE REFUELING STATION (AOC-O)

Site OT-45 is located southeast of Building 296 near the intersection of West Delaware Avenue and West Fourth Street and occupies about four acres. The Old AGE Refueling Station was used to refuel aerospace ground equipment (AGE) and was replaced with a parking lot in the 1980s. The Old AGE Station is generally defined as the area bounded by Building 296 and West Delaware Avenue. The entire site is covered with asphalt, concrete, or landscaping gravel.

Three USTs, two approximately 12,500 gallons each and one approximately 10,000 gallons, were utilized at the Old AGE Station. The USTs stored MOGAS, diesel, and JP-4. The fuel station and USTs were removed in the 1980s.

The site is relatively flat. Site stratigraphy consists of sands, silts, and clays. Groundwater occurs at approximately 15 feet BGL in an unconfined aquifer at the site and flows in a southerly direction.

One monitoring well and one borehole were installed at this site for the 1987 Dames and Moore RI. In addition, seven monitoring wells were installed and two soil borings were drilled at this site for the Walk, Haydel and Associates, Inc. Stage I and II RIs (1988 and 1989). Free product was found in the groundwater and significant levels of hydrocarbons and solvents were found in the soil. The site was completely remediated in the fall of 1991, and a DD was completed. However, NMED requested additional investigation to support that no TRPH exceeds 1,000 mg/kg. Additional investigation was conducted by Foster Wheeler Environmental Corporation in 1995 as part of the Table 1 Phase II RFI. The investigation revealed only one soil sample exceeding the 1,000 ppm TRPH cleanup level; however, contaminated soil was not found in a boring immediately adjacent. OT-45 was recommended for No Further Action. A DD was signed by NMED in September 1996 and the site closed.

C1-2.46 SS-46–JP-4 SPILL SITE (AOC-S, SWMU 130)

The JP-4 Spill Site is located on the southeast side of the main taxi access close to the projected Fourth Street intersection. Site SS-46 is designated as the area surrounding the JP-4 underground waste tank. It is bounded by the Main Taxiway, Taxiway No. 4, and Taxiway No. 5. There are no permanent structures within Site SS-46 boundaries. There are no drainage ditches near the site; consequently, it receives runoff from the surrounding taxiways as sheet flow. The site's surface is well graded with little cover. Apart from the small concrete hardstand and the tank, the only surface cover is thinly spread gravel near the edge of the runways. Groundwater occurs approximately 15 feet BGL, and the hydraulic gradient is in a southerly direction.

Site SS-46 consists of a 25,000-gallon JP-4 underground waste oil tank. The tank was installed in 1978 without a containment system and lies 2 feet below grade. The cracked concrete hardstand covering the entire area is surrounded by a fence.

The site was investigated in the 1989 Walk, Haydel and Associates, Inc. RI because there was concern that the tank was leaking. Four monitoring wells were installed. Soil and groundwater samples were analyzed for volatile and semivolatile organics, lead, and Total Recoverable Petroleum Hydrocarbons (TRPH). No significant levels of contamination were reported, although the presence of a limited number of fuel constituents in the soil and groundwater suggests the tank has a very small leak. The tank was removed in 1995 as recommended in the DD signed by NMED in April 1993. Long-term monitoring is being performed at Site SS-46 through 2014.

C1-2.47 SD-47–POL WASHRACK DISCHARGE AREA (SWMUS 21, AND 22)

Site SD-47, POL Washrack Discharge Area, is located next to the POL Storage Area in the northeastern section of the Main Base Area. The POL Storage Area occupies a large area near the Base's eastern boundary. The washrack is located on the west side of the storage area. The POL Storage Area is entirely enclosed by a chain-link fence. Dillard Draw arroyo is on the eastern boundary of the storage area. The POL Washrack Discharge Area (a large open field) is approximately one acre in size and is located between the POL Storage Area fenced western boundary and the drainage ditch which was intended to receive the washrack's waste water.

The POL washrack has been in operation since 1953. When built, the washrack had no oil/water separators and washwater flowed directly to the nearby drainage ditch. Two oil/water separators were installed at the washrack in 1980. Water from the oil/water separators flowed underground southwest of the POL area into the drainage ditch approximately 100 feet from the west fence line. Concern over the discharge developed when it was discovered that the separator was working improperly and was allowing high concentrations of petroleum product to be discharged

This site drains to the east toward Dillard Draw. The site stratigraphy consists of sand and silty sand with low to moderate permeability. Groundwater occurs in an unconfined aquifer 10 feet BGL. The groundwater flow is to the south to southwest.

A DPM score of 18 was assigned to this site during the CH2M Hill 1983 Records Search. The 1989 RI (Walk, Haydel and Associates) determined that the clay liner was broken. Five monitoring wells were installed and soil and sediment samples were collected. Free product was observed on the water table and the soil/sediment was found to have high levels of petroleum hydrocarbons.

After issuance of the RI report, one oil/water separator was abandoned in-place and the other replaced with a concrete oil/water separator. The 8-inch drain line (where wastewater from the separators was discharged) was abandoned and wastewater routed through a new 8-inch PVC line which connects to the sanitary sewer system. With a sanitary sewer line to the site, the septic tank and drain field were no longer needed and were abandoned.

Excavation of contaminated soil in the discharge area was accomplished in FY 1992. Contamination present beyond the fenced boundary of the POL area was not excavated. Additional investigation activities were performed by Woodward-Clyde and Associates to further delineate the extent of the remaining contamination. A bioventing system was installed at SD-47 in April 1995 and the TRPH-contaminated soils remediated to below the 1,000 ppm TRPH NMED Cleanup Standard. A DD was signed by NMED in September 1996. The system was closed in 1998.

C1-2.48 SS-48–MILITARY GAS STATION (AOC-N)

The Military Gas Station, Building 137, is located in the northeast section of the Main Base on Fifth Street. Site SS-48 encompasses an area of approximately two acres bound by Building 137, the transportation washrack, and Building 105.

Building 137 serves as the office and administration area of the military gas station. Associated permanent facilities are the three underground storage tanks (Tank Numbers 1, 2, and 3), a pumphouse, and a dispensing island. The tanks each have a capacity of 12,000 gallons. Tanks 1 and 3 contain regular gasoline. The area above the tanks is covered with gravel. A vehicle washrack is also located on site. Groundwater occurs approximately 15 feet BGL. The hydraulic gradient is towards the south.

The Military Gas Station has been in operation for over 30 years and two of the three original underground tanks are still in service and currently storing motor gasoline.

In 1986, it was reported that water was found in Tank No. 2. The water was pumped out; however, it was found again about a week later. An integrity test confirmed the 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 area.

The 1989 RI of Site SS-48 was conducted by Walk, Haydel and Associates, Inc. Field activities consisted of the drilling, installation, and sampling of seven monitoring wells. The RI report stated that Site SS-48 has soil and groundwater contamination downgradient of an underground storage tank; however, the contamination does not pose a risk to public health or the environment.

The 1993 DD report concluded that Site SS-48 posed no significant threat to human health or the environment. Therefore, further investigation or remedial measures are not appropriate, and the DD recommended that the site be closed out under the ERP and the tank be removed. The DD was signed by NMED in April of 1993 and the tanks were removed that year. As part of the No Action remedy the site is undergoing long-term monitoring through FY 2006.

C1-2.49 WP-49--SEWAGE LAGOONS (SWMUS 139, 140, 155, 156, AND 184)

The sewage lagoons are located on the southern portion of the Base. There are seven lagoons in the system (Ponds A through G) encompassing an area over 100 acres in size. Domestic and industrial wastewater enters the system through a headworks where the flow is screened and degritted. The flow is then discharged to two aerated lagoons (Ponds A and B). Then the wastewater flows through four lagoons, which are operated in series (Ponds C, D, E, and G). An additional impoundment, Pond F, is used to recirculate water from Pond E back to the headworks of the system. Discharge from the last lagoon in series (Pond G) flows via an open ditch to Lake Holloman (166 acres). Overflow from Lake Holloman is discharged to Lake Stinky, a small salina.

The treatment system receives approximately 1.3 million gallons per day (MGD) of wastewater. Domestic wastewater is generated from offices, shopping and restaurant facilities, and family housing. Industrial wastewater is generated from aircraft washing facilities, corrosion control facilities, machine and maintenance shops, and medical research and analytical laboratories. The waste in the seven lagoons consists of a sludge blanket overlain by four to five feet of water.

The sewage lagoons were built along a natural drainage system flowing south to southeast to the playa that encompasses Lake Holloman and Lake Stinky. The stratigraphy of the area consists of a layer of silt or sand underlain by a layer of saturated sand or silty sand. Over most of the area, this saturated layer is underlain by a layer of clay. Depth to groundwater ranges from 2 to 13 feet BGL.

The following hazardous wastes are known to have been discharged to the sewage treatment system: volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, and metals.

PCBs, semivolatile organics (primarily polynuclear aromatic hydrocarbons), and metals (chromium, copper, lead, silver, and zinc) were detected in the sludge samples collected in several sampling rounds by Holloman AFB, USAF, and Radian personnel from 1984 to the present.

In 1985, EPA Region VI and NMED contended that the seven sewage lagoons are Hazardous Waste Management Units (HWMUs). Therefore, a RCRA groundwater monitoring system was installed adjacent to the sewage lagoons in July 1989 to detect potential releases from the impoundments as specified in the Federal Facilities Compliance Agreement. The monitoring network initially consisted of two upgradient wells and eight downgradient wells. However, one upgradient well was removed from the network and two new wells added to the system. Recent results of the groundwater sampling efforts conducted at the sewage lagoons (Radian, April 1992) show low levels of organochlorine pesticide compounds in the groundwater. The sewage lagoons do not appear to have significantly affected the groundwater.

Hazardous waste discharges to the lagoons have been stopped. A new wastewater treatment plant was constructed and it went on-line in July 1996. The lagoons required remediation of sludge/sediment before closure of WP-49 could be accomplished. Interim cleanup of sludge in Ponds A and B was performed in 1990 with the removal of PCB-contaminated sludge. The ponds were drained with the exception of Lagoon G, which remained filled in order to comply with requirements outlined in the FONSI and NPDES permit. An IRA was performed in the fall of 1996 for disease vector control. The RD/RA phase was completed in the summer of 1998. The RA of placement of the soil cover over Ponds A–F (60.9 acres) was completed and the site recommended for closure in 1998 with LTM. A DD closing the site with LTM was signed in FY 2000; however NMED has since released the Base from LTM requirements.

C1-2.50 WP-50--WASTE DISPOSAL PIT

Site 50 is located in the North Base Area of Holloman AFB adjacent to the Base Geophysics Laboratory (Building 1251). The site consists of a 10-foot square, 4-foot deep pit that contained several empty 55-gallon drums (lube oil drums), 5-gallon buckets made of either plastic or metal (contents are unknown), miscellaneous 1-gallon and 32-ounce containers, and other debris such as wood and cardboard boxes. Groundwater occurs 25 feet BGL.

Many of the buckets and containers were either rusted or weathered and the labels are illegible. These materials were reported to be disposed of at this location after the Army finished conducting a field drill in the North Base Area. The material in the pit was removed by Rinchem Company, Inc. in 1991. Empty or non-hazardous containers or materials were removed and disposed of by the Base Bioenvironmental Engineers, and hazardous materials were lab-packed and transported to the Base DRMO by Radian. Groundwater occurs 25 feet BGL.

The Radian 1992 RI is the only ERP document that discusses this site. One soil boring was drilled for the Radian RI. The only inorganic constituent found in relatively elevated levels was mercury. Petroleum hydrocarbons, pesticides, and other organic compounds were detected in the soil. Site closeout has been approved for this site in the DD signed by NMED in September 1994.

C1-2.51 RW-51--PRIMATE RESEARCH LAB BOREHOLE DISPOSAL SITE (SWMU PRI-S)

On 25 February 1991, Radian and Base Environmental Engineering personnel interviewed an anonymous ex-employee who worked at the Primate Research Laboratory (PRL). The employee indicated at least two dates in the 1980s when unknown liquids (approximately four pints) were disposed of in a standpipe located inside the animal housing area. Due to the nature of the research, PRL uses various chemicals, toxic agents, radiological materials, and human pathogens. Because the description of the liquid waste disposed of down the standpipe was vague, the waste may have contained any of the constituents used at the PRL. Also methanol, acetone, acetonitrile, and possibly methyl ethyl ketone were reportedly discharged into the sewer, so it is possible that the waste disposed of in the borehole could have contained these materials.

The area is flat and has no natural topographic features, surface water impoundments, or drainage features. Surface drainage in the estimated location of the standpipe is to the west. Groundwater occurs approximately 45 feet BGL with the hydraulic gradient in a northerly direction towards Lost River Basin.

Bioenvironmental Engineering performed an alpha and beta/gamma detection survey in 1991, and Radian performed a site assessment/preliminary investigation for the 1992 RI report. Radiation was not detected on the surface of the property and no evidence of the disposal standpipe was found. The DD recommending site closeout was signed by NMED in September 1994.

C1-2.52 OT-52–BOLES AND SAN ANDRES WELL FIELD AREA

Site OT-52 (Boles and San Andres Well Field Area) is located 14 miles southeast of Holloman AFB on the western slope of the Sacramento Mountains. This well field area consists of 2,128 acres of fee purchased land and 5,207 acres of easements. The primary source of water for Holloman AFB is this well field and the nearby privately owned Douglas Well Field. Water supply facilities at the site include 15 wells with associated storage tanks and pumping stations.

The ERP Phase I study (CH2M Hill 1983) stated, based on interviews with Base personnel knowledgeable about the facilities and a helicopter overflight of the area, that no known hazardous waste disposal or spill sites were identified at the site.

The site was not considered to present significant concern for adverse effects on health or the environment and was not examined during ERP Phase II studies. Thus, specific media sampling and analytical testing were not conducted and data quality objectives were not established for the site. The 1993 DD recommending that further investigation or remedial activities are not appropriate was signed by NMED in April of 1993 and the site closed out under the ERP.

C1-2.53 OT-53–BONITO LAKE

Site OT-53 (Bonito Lake) is located in the Sacramento Mountains and is an impoundment on Rio Bonito. The lake is a surface-water supply reservoir for the City of Alamogordo and Holloman AFB. Holloman AFB runs a 22-inch diameter water transmission line from the site constructed by the Air Force in 1957. The transmission line is situated on 77 acres of perpetual easement and 78 acres of general use license and general use permit land. Maintenance of the water line is performed by the City of Alamogordo.

The CH2M Hill 1983 Phase I study stated, based on interviews with Base personnel knowledge about the site, that no known hazardous waste disposal or spill sites were identified in the Bonito Lake area.

The site was not considered to present significant concern for adverse effects on health or the environment and was not examined during ERP Phase II studies. Thus, specific media sampling and analytical testing were not conducted and data quality objectives were not established for the site. The 1993 DD recommended that further investigation or remedial activities are not appropriate and that the site be closed out under the ERP. The DD was signed by NMED in April 1993.

C1-2.54 OT-54–SILVER CITY RADAR SITE

Site OT-54 (Silver City Radar Site) is a radar installation located on one acre of FAA owned land. The site is a joint surveillance system facility for FAA air traffic control and Air Force defense operations. Air Force personnel are responsible for office work and radar scope manning. Maintenance is accomplished by FAA personnel. An on-site septic tank with drain field is used for sanitary wastewater. Water is trucked to the site and stored in a water tank. Solid waste, primarily trash, is hauled off site by a disposal contractor. Periodically, spent, low-level radioactive magnetron tubes are containerized and sent to Holloman AFB for final disposition. No large quantities of solvents or cleaners are used at the site.

The CH2M Hill 1983 Phase I study stated, based on interviews with Base personnel knowledgeable about the site, that no known past hazardous waste disposal or spill sites were identified at the facility.

The site was not considered to present significant concern for adverse effects on health or the environment and was not examined during ERP Phase II studies. Thus, specific media sampling and analytical testing were not conducted and data quality objectives were not established for the site. The 1993 DD recommended that further investigation or remedial activities are not appropriate and that the site be closed out under the ERP. The DD was signed by NMED in April 1993.

C1-2.55 OT-55–EL PASO RADAR SITE

Site OT-55 (El Paso Radar Site) is a radar installation located on one acre of Federal Aviation Administration (FAA) owned land. The site is a joint surveillance system facility for FAA air traffic control and Air Force defense operations. Air Force personnel at the site are responsible for office work and radar scope manning. Maintenance is accomplished by FAA personnel. Periodically, spent, low-level radioactive magnetron tubes are containerized and sent to Holloman AFB for final disposition. Water and sewage service for the site are provided by Horizon City, Texas. Solid waste, primarily trash, is hauled off site by a disposal contractor. No large quantities of solvents or cleaners are used at the site.

The CH2M Hill 1983 Phase I study stated, based on interviews with Base personnel knowledgeable about the site, that no known past hazardous waste disposal or spill sites were identified at the facility.

The site was not considered to present significant concern for adverse effects on health or the environment and was not examined during ERP Phase II studies. Thus, specific media sampling and analytical testing were not conducted and data quality objectives were not established for the site. The 1993 DD recommended that further investigation or remedial activities are not appropriate and that the site be closed out under the ERP. The DD was signed by NMED in April 1993.

C1-2.56 SS-56--WEST RAMP FUEL SPILL

The project site is located southwest of the main runways and covers over 20 acres. Fuel contamination of the soils and water beneath the ramp is suspected due to past fuel spills on the ramp.

The site is a concrete pad used for parking and maintenance of airplanes. The concrete pad slopes slightly to the south, approximately 2 to 6 feet over the 1,500 feet length. The north two-thirds of the ramp is composed of older concrete and the south one-third is composed of newer concrete. A row of buildings on each side of the ramp contain cleaning, sanding, painting, mechanical repair and maintenance facilities.

The area was formerly vegetated by desert sagebrush. Groundwater is located approximately 4 feet BGL; the hydraulic gradient is towards the southeast. Bedrock outcrops were not observed on the site.

Six monitoring wells were installed and 14 borings were drilled in the 1991 Woodward-Clyde RI. This is the only ERP document that reviewed this site. Soil samples were collected from all well locations and borings. Petroleum hydrocarbon levels above 100 mg/kg were found in soil from three of the boreholes and wells. Low levels of ethyl benzene (1.1 µg/L) and xylenes (10.4 µg/L) were found in one monitoring well.

The DD submitted and signed by NMED in September 1996 recommended No Further Action at Site SS-56 with long-term monitoring through FY 2009.

C1-2.57 SS-57–OFFICER'S CLUB (AOC-V)

In 1991, hydrogen sulfide odors were identified in the Officer's Club building. Investigations were performed in October 1991 and May 1992 to evaluate soil and groundwater conditions to determine the source of the odors. These investigations indicated that the source of the odor is hydrogen sulfide resulting from natural anaerobic degradation of subsurface diesel fuel.

Radian conducted a third investigation in November 1992 to better define the horizontal and vertical extent of petroleum hydrocarbon contamination. TRPH-contamination was detected at concentrations exceeding the cleanup standards primarily below the water table. Groundwater is located approximately 8 to 10 feet below the ground surface. A bacteria enumeration study and biological screening was performed in conjunction with the Radian investigation. A biosparging/ SVE system was recommended.

A positive air-handling system was installed at the Officer's Club to prevent nuisance odors from accumulating in the building. An air sparging/SVE pilot test was performed in April 1996. This system became operational full-time in October 1996. The objective of the system is to create aerobic conditions under which biodegradation of petroleum hydrocarbon contamination may continue without hydrogen sulfide. The site was expected to be submitted to NMED in 2001 for closure; however remaining hot spots required additional clean up. Completion of remedial action is anticipated in 2005, at which time a request will be submitted for closure with LTM through 2007.

C1-2.58 LF-58--INCINERATOR LANDFILL (SWMU 231)

The Incinerator Landfill is located north of the Main Base Area approximately 3,000 feet west of the Unconventional Fuels Area. According to the Base Civil Engineering Department, the incinerator, located next to the landfill, was used to burn unconventional fuels and photographic film. Ashes from the incinerator were buried in the landfill. No ERP work has been performed at this site.

Contamination was detected in surface soil samples and five areas containing buried wastes were identified by an electromagnetic survey and exploratory excavation performed during the PA/SI. Further investigation was completed by Radian between October and December 1994. The results indicated that the extent of unconventional fuels contamination is limited to two areas: shallow discontinuous stained areas near the incinerator and soils within and below Waste Area D. Groundwater data indicates that the presence of unconventional fuels in the soil has not affected groundwater quality. The quantitative risk assessment concluded that the site does not pose a risk to human health. The presence of aluminum, which may not be related to the release at LF-58, may pose an ecological risk to the environment; however, due to the conservative nature of the risk assessment, No Further Action is recommended. A DD for site closure is pending.

C1-2.59 SS-59–T-38 TEST CELL FUEL SPILL (SWMU 229)

The T-38 Test Cell is located within the Holloman AFB airfield, northeast of Building 638, and along the northwest edge of Taxiway A, which runs northeast-southwest. A radar station (Building 642) is located approximately 800 feet to the northwest. The Test Cell area is bordered by an access road approximately 1,500 feet to the southwest, a runway approximately 2,500 feet to the north, and Taxiway A to the southeast.

From approximately 1966 to 1977, the T-38 Test Cell was used as an F-4 trim pad and for testing F-4 aircraft engines. The Cell used a water suppression system for the engine tests which consumed 80,000 gallons per minute of water from the nearby water tank. This was later converted to a dry suppression system.

From 1979 to 1990, there were 125 T-38 aircraft located at Holloman AFB. During this time frame, there were 90-100 engine tests performed each month at the test cell. Presently, there are only 38 T-38 aircraft located at the Base. An engine is tested at the Cell every two to three days. Review of as-built drawings indicate that the T-38 Test Cell facility, as it stands today, has been in operation since about 1978. At that time, the facility was upgraded to include a support facility, Building 638.

In 1991, inventory records indicated that approximately 2,000 gallons of JP-4 had been lost. The cause of this release was identified as leaking underground piping connecting the aboveground JP-4 tank to the Test Cell. Shortly after this discovery, the underground piping was replaced with aboveground piping.

Interviews with engine testing contractor personnel (DYNECORP) during a site visit indicated that the leakage could have occurred at any point in the underground line directly beneath the Test Cell. From June 1991 to July 1993, 379 engine tests were conducted at the Cell. During this time frame, 83,689 gallons of JP-4 fuel were delivered to the Cell.

Results of the initial Phase I investigation conducted in May 1993 indicated that more than 2,000 gallons of JP-4 had been spilled. Floating product was encountered in borings near the Test Cell and to the southwest and west. Measurable amounts of light nonaqueous-phase liquid (LNAPL) were detected in three monitoring wells installed at the site. Headspace analysis and visual inspection in the field indicated that 16 of the 18 borings had fuel contamination. Additional soil borings were taken, and three additional monitoring wells were installed in July 1993 to delineate the areal extent of soil contamination and to more clearly define the contamination plume. Preliminary calculations estimated that there could be up to 1.7 million gallons of product spilled at SS-59.

A Rapid Response Interim Remedial Action was implemented by the U.S. Army Corps of Engineers-Omaha and IT Corporation. A Dual Phase Soil Vapor Extraction (DPSVE) system with 11 extraction wells was installed within the region of the thickest floating product. The system began operation in January 1994 and operated until January 1995, recovering approximately 50,000 gallons of product. Investigations conducted in conjunction with the installation of the IRA revised the estimate of the quantity of spilled product to approximately 550,000 gallons.

The full-scale DPSVE system with 122 extraction wells began operation in June 1996. The full-scale system influences the entire LNAPL plume and will remove floating product as well as soil vapors from the vadose zone. TRPH-contaminated soils are anticipated to be remediated to below the NMED cleanup standard by FY 2006. This is a non-ERA project, therefore no ERA funding requirements for this site are identified in this MAP.

C1-2.60 SS-60–BLDG. 828 FUEL SPILL (SWMU 230)

Building 828 is located in the west area of Holloman AFB, next to Buildings 821 and 827, and along Bunyap Place about one block east of 49th Avenue and one block north of Black Sheep Way. Building 828 is operated as part of the AGE maintenance facility, which also includes Building 822.

Building 828 is used by the 49th Maintenance Squadron to repair, maintain, and service aerospace ground equipment. The facility includes three fuel pumps for servicing assigned AGE. Other SWMUs in this area include Bldg. 827 Oil/Water Separator (SWMU 29) and Bldg. 827 Washrack (SWMU 93).

The building was placed in operation in 1977 as an AGE shop. Three USTs were installed just east of the building. Their rated maximum capacities were 5,000 gallons (2) and 3,000 gallons. The fuel pumps, located south of the building, dispensed unleaded, JP-4, and diesel fuel.

In November 1990, shop personnel detected a leak in the diesel UST. A leak in the JP-4 tank was detected two months later. Three above-ground tanks (6,000 gallons each) were installed, and use of the USTs ceased in June 1991. In October 1991, the gas pumps became operational. Shortly thereafter, shop personnel recorded a leak of approximately 4,700 gallons of unleaded fuel. Leak tests revealed that the unleaded and JP-4 USTs were leaking from the underground piping at the pump connections. In December 1992, an "odor" complaint prompted the Holloman AFB Bioenvironmental Engineering office to perform a gas survey at Bldg. 827, located southwest of Bldg. 828. Highest fuel readings were 2,300 ppm (commode) and 2,500 ppm (drain plug). New sewer connections have been installed at this location.

An RFI was performed by Woodward-Clyde in 1993. Soil borings taken near the gas pumps confirmed the presence of free product on the water table. Additionally, 10 of 18 soil borings revealed contamination exceeding NMED cleanup levels. The RFI was submitted to EPA on 1 November 1993.

A DPSVE system with seven extraction wells became operational in May 1996. The system successfully removed free product from the water table and remediated soils to below the NMED cleanup standard. The Base recommended closure of the site in FY 2001.

C1-2.61 SS-61–FUEL SPILL (AOC-1001)

This project is the former Area of Concern-1001 (AOC-1001)/Site SS-61. An SI was completed on this site in 1997. The site relative risk is currently ranked High based on the soil media. A Phase II RI/FS is being conducted to determine the nature and extent of soil and groundwater contamination and to determine the appropriate RA. The proposed fieldwork includes additional Direct Punch Technology (DPT) geotechnical soil investigation points and an Electro-Magnetic (EM) survey. The additional information derived from fieldwork will be used to define the site geologic, hydrologic and geochemical characteristics required to determine the nature and extent of contamination and transport mechanisms. This project also provides for developing defensible human and ecological risk assessments and the generation of a final RI report.

AOC-1001 was first discovered during an aerial photo investigation of a site located >1000 feet to the northwest. The 1947 image shows fuel tanks and ground surface disturbances and discoloration at the site. The next round of photos, from 1972, shows that the tanks were removed and a concrete slab was installed immediately south of the 1947 disturbed area. AOC-1001 is located adjacent to what appears to be an abandoned aircraft fueling depot and maintenance area at Building 1001. This area was initially used to support B-25 aircraft during the late 1940s. South of the site and across the street is the 6585 Test Group Air Ground Equipment (AGE) Shop. The Holloman AFB Environmental Restoration Program Records Search completed by CH2M Hill in 1983 states that waste generated at this shop included contaminated engine oil, PD-680, hydraulic fluid, and waste JP-4. The groundwater flow moves north-northwest and this shop may have impacted AOC-1001.

In June 1996, during the SI, ten Direct Push Technology (DPT) boreholes were installed throughout the AOC. Soil and groundwater samples were retrieved and analyzed from each borehole. Benzene and 1,2-DCA were identified and considered the contaminants of concern (COC) in DPT groundwater sampling locations during the initial AOC-1001 SI. However, no COCs were found in any soil samples retrieved. During the final stage of the SI, 14 additional DPT boreholes and 4 monitoring wells were installed at AOC-1001 to characterize the site. Initially, four DPT boreholes were strategically placed around the site. Soil and water samples were taken and analyzed using an on-site mobile field lab. Additional DPT boreholes were installed which closed on the contaminant source location utilizing the real-time results of the mobile lab. Benzene was identified from a soil sample at 29.4 mg/kg and 1,2-DCA was identified at a level of 0.037 mg/kg. Groundwater samples identified benzene at 11,000 μg/l and 1,2 DCA at 940 μg/l. The source of the contaminants was traced to a general area and an RI/FS performed to define the nature of the source. The results were submitted to the State in 2001 and are currently under review.

C1-2.62 DP-62–DISPOSAL PIT (AOC – RITAS DRAW)

AOC – Ritas Draw is located approximately 300 feet west of Site OT-04, the Acid Trailer Burial Site, which was investigated for disposal of materials related to early missile testing, including unconventional fuels. An IRA was performed at Site OT-04 in 1993 and the site subsequently closed out in 1995. During a field reconnaissance in the area of AOC-Ritas Draw, two partially buried drums were discovered. These drums are believed to be related to early missile testing that occurred on Holloman AFB during the 1950s. The possible contents of the drums, or the potential for additional drums, are unknown at this time. A PA for this site was completed and submitted in 1998 and the response received in August 2001. An RI is planned for FY 2004. This is a CERCLA response activity eligible for ERA funds.

C1-2.63 DP-63–MUNITIONS DISPOSAL PIT (AOC – MUNITIONS YARD)

The Munitions Disposal Pit (AOC – Munitions Yard) is located to the northeast of the runway area, inside the Munitions Yard. Originally, the AOC was located immediately north of the munitions yard, but expansion of the yard in the 1950s and 1960s has enveloped the AOC within the compound. Munitions were placed into a pit with fuel and wood and then ignited to render the ordnance inert. Over time, fuel may have seeped into the soils directly below the treatment area. The AOC has been referred to as "the bomb dump" by munitions and explosive ordnance disposal (EOD) personnel. Therefore, the exact type of munitions treated may have included munitions larger than 50 caliber small arm rounds. Environmental flight personnel performed a cursory visual inspection of the AOC during the summer of 1997 and found munitions residuals exposed on the ground surface throughout the area as a result of erosion. A PA/SI was completed in FY 2000 and an RI/FS was completed in FY 2002, the findings of which are currently being evaluated to determine future course of action.

C1-2.64 DP-64—CHEMICAL AGENT SITE

The Chemical Agent Site was identified as a potential chemical agent identification set disposal site and is located to the northeast of LF-01. The site was added to the ERP in FY 2000. Interim Remedial Action took place in FY 2002, and further remedial action will be carried out through FY 2004. Closure with LTM is anticipated in FY 2004.

APPENDIX C2

ACTIVE PROJECT SUMMARIES

TABLE C2-1 HOLLOMAN AFB PROJECT INDEX

Management Action Plan
Holloman AFB, New Mexico

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KWRD20017009	LTM MULTI-SITES	C2-5
KWRD20027009	LTM MULTI-SITES	C2-5
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IRA AOC-1 CHEMICAL AGENT REMEDIATION

PROJECT NO.: KWRD20007001

CONTRACTOR: Foster Wheeler
CONTRACT #: DACW45-94-D-0003
D.O.: 27

PROJECT COST: $199,739
AWARD DATE: 6-29-00
P.O.P.:

DESCRIPTION: This project involves an IRA at AOC-1 (DP-64) for chemical agent remediation.

RI/FS Site SS-61

PROJECT NO.: KWRD20037061

CONTRACTOR:
CONTRACT #: DACW45-02-D-0012
D.O.: 05

PROJECT COST: $213,487
AWARD DATE: 01-13-03
P.O.P.:

DESCRIPTION: This project involves a remedial investigation/feasibility study for Site SS-61.

RI/FS Site DP-62

PROJECT NO.: KWRD20037062

CONTRACTOR:
CONTRACT #: DACW45-02-D-0012
D.O.: 05

PROJECT COST: $347,112
AWARD DATE: 01-13-03
P.O.P.:

DESCRIPTION: This project involves a remedial investigation/feasibility study for Site DP-62.

LTM MULTI-SITES

PROJECT NO.: KWRD20017009

CONTRACTOR: FOSTER WHEELER ENVIRONMENTAL CORP
CONTRACT #: DACW45-94-D-0003
D.O.: 32

PROJECT COST: $126,660
AWARD DATE: 1-18-01
P.O.P.:

DESCRIPTION: This project involves long term monitoring at multiple sites.

PROJECT NO.: KWRD20027009

CONTRACTOR: FOSTER WHEELER ENVIRONMENTAL CORP
CONTRACT #: DACW45-94-D-0003
D.O.: 37

PROJECT COST: $209,553
AWARD DATE: 12-31-01
P.O.P.:

DESCRIPTION: This project involves long term monitoring at multiple sites.

PROJECT NO.: KWRD20037009

CONTRACTOR: FOSTER WHEELER ENVIRONMENTAL CORP
CONTRACT #: DACW45-03-P-0098
D.O.:

PROJECT COST: $21,430
AWARD DATE: 03-31-03
P.O.P.:

DESCRIPTION: This project involves long term mo nitoring at multiple sites. Two delivery orders are included: one for $21,430 and one for

---

PROJECT NO.: KWRD20037009

CONTRACTOR: FOSTER WHEELER ENVIRONMENTAL CORP
CONTRACT #: DACW45-03-P-0096
D.O.:
PROJECT COST: $64,932.
AWARD DATE: 03-31-03
P.O.P.:

DESCRIPTION: This project involves long term monitoring at multiple sites.

RA-O MULTI SITES

PROJECT NO.: KWRD20037018

CONTRACTOR: FOSTER WHEELER ENVIRONMENTAL CORP
CONTRACT #: DACW45-94-D-0008
D.O.: 01

PROJECT COST: $1,740,535
AWARD DATE: 1-22-03
P.O.P.:

DESCRIPTION: This project involves remedial action-operations for multisites.

PROJECT NO.: KWRD20037018

CONTRACTOR: FOSTER WHEELER ENVIRONMENTAL CORP
CONTRACT #: DACW45-94-D-0008
D.O.: 02

PROJECT COST: $487,775
AWARD DATE: 07-16-03
P.O.P.:

DESCRIPTION: This project involves remedial action-operations for multisites.

RI/FS Site DP-63

PROJECT NO.: KWRD20027005

CONTRACTOR: URS GREINER WOODWARD CLYDE FEDERAL SVCS
CONTRACT #: DACW45-94-D-0003
D.O.: 37

PROJECT COST: $280,239
AWARD DATE: 12-31-01
P.O.P.:

DESCRIPTION: RI/FS

PA/SI Site DP-63

PROJECT NO.: KWRD20037005

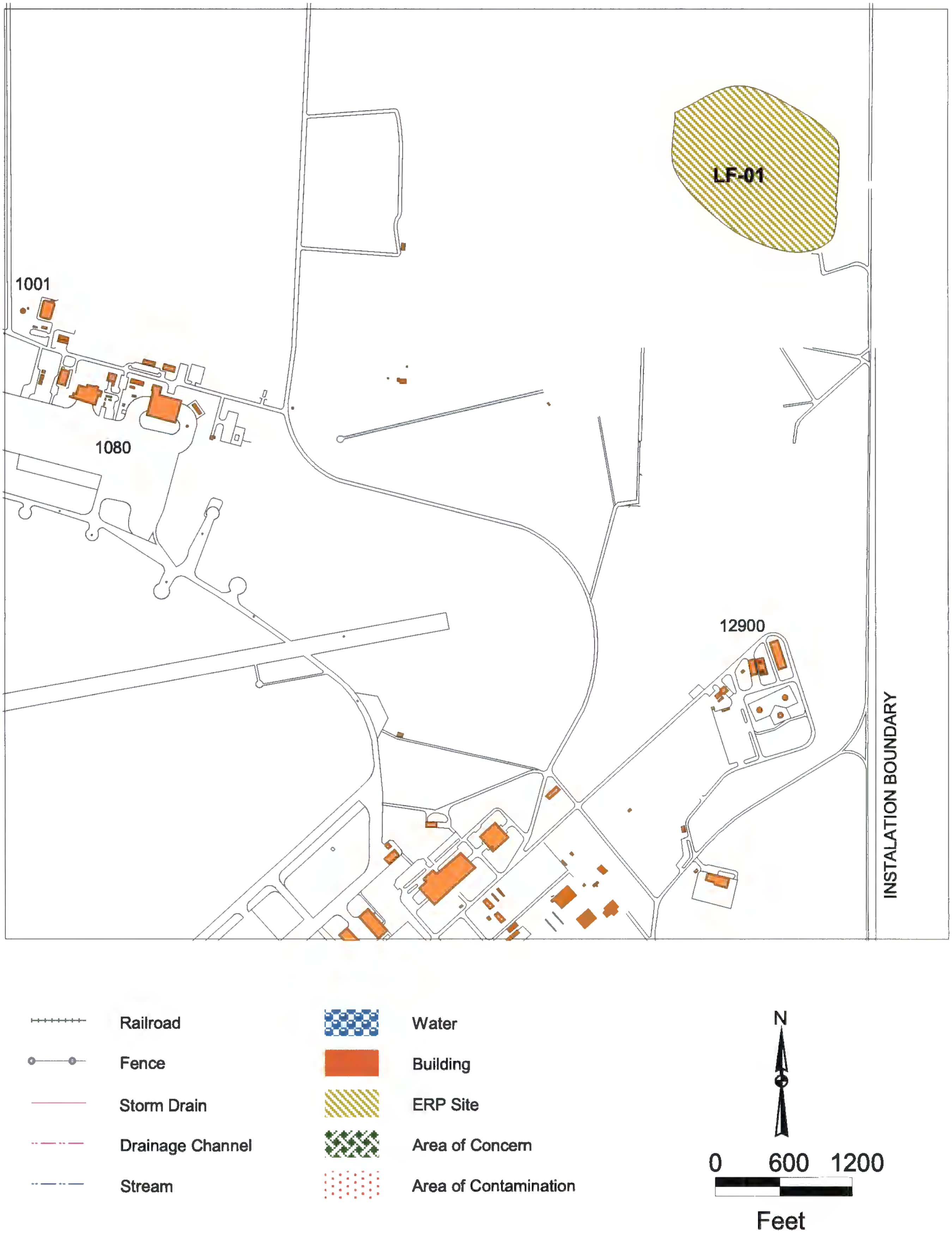
CONTRACTOR: URS GREINER WOODWARD CLYDE FEDERAL SVCS
CONTRACT #: DACW45-02-D-0012
D.O.: 05

PROJECT COST: $138,780
AWARD DATE: 01-13-03
P.O.P.:

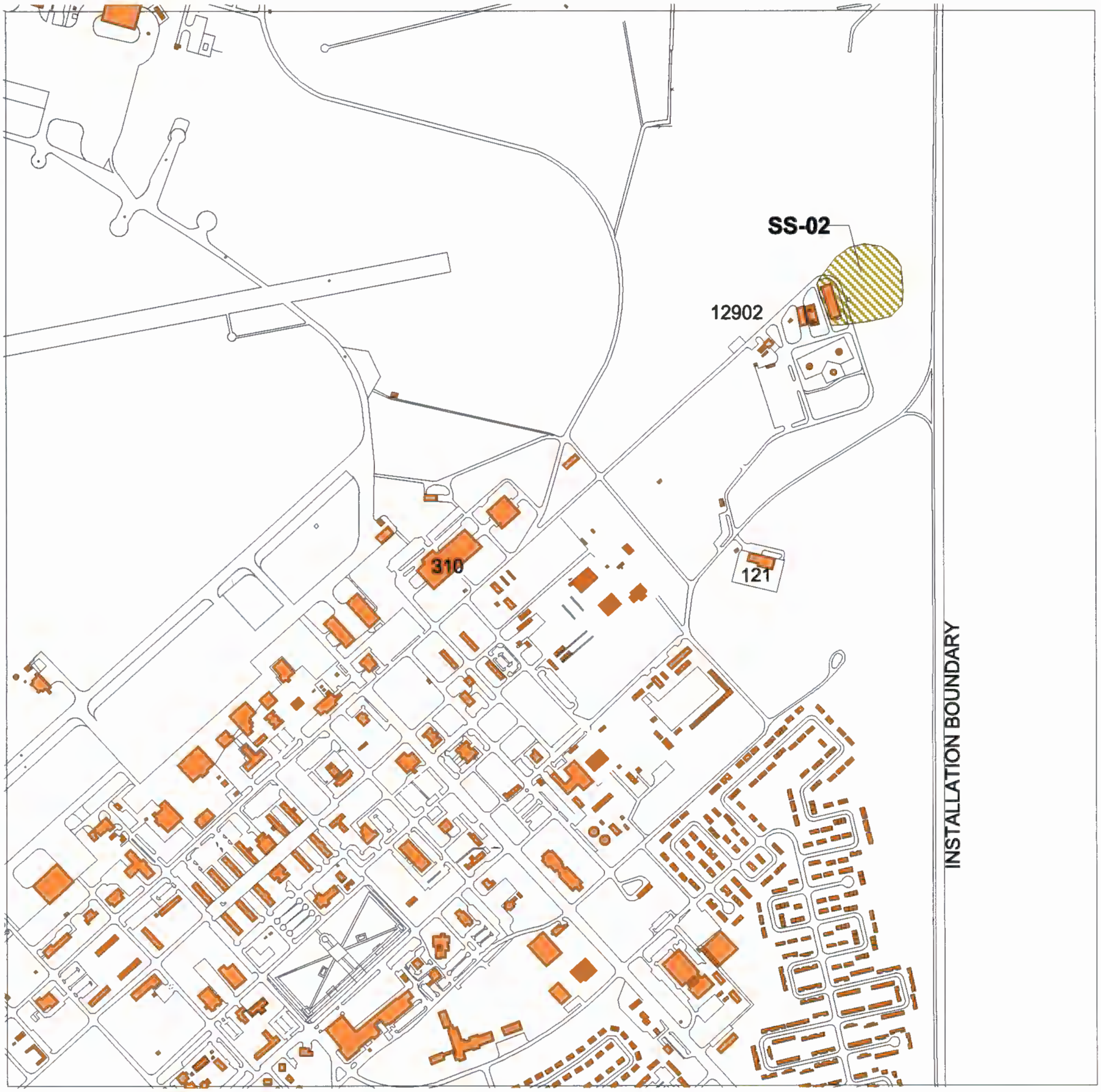
DESCRIPTION: PA/SI

APPENDIX C3

INSTALLATION ERP SITE MAPS



Holloman Air Force Base New Mexico	LF-01, EXISTING MAIN BASE LANDFILL	Figure C3-1

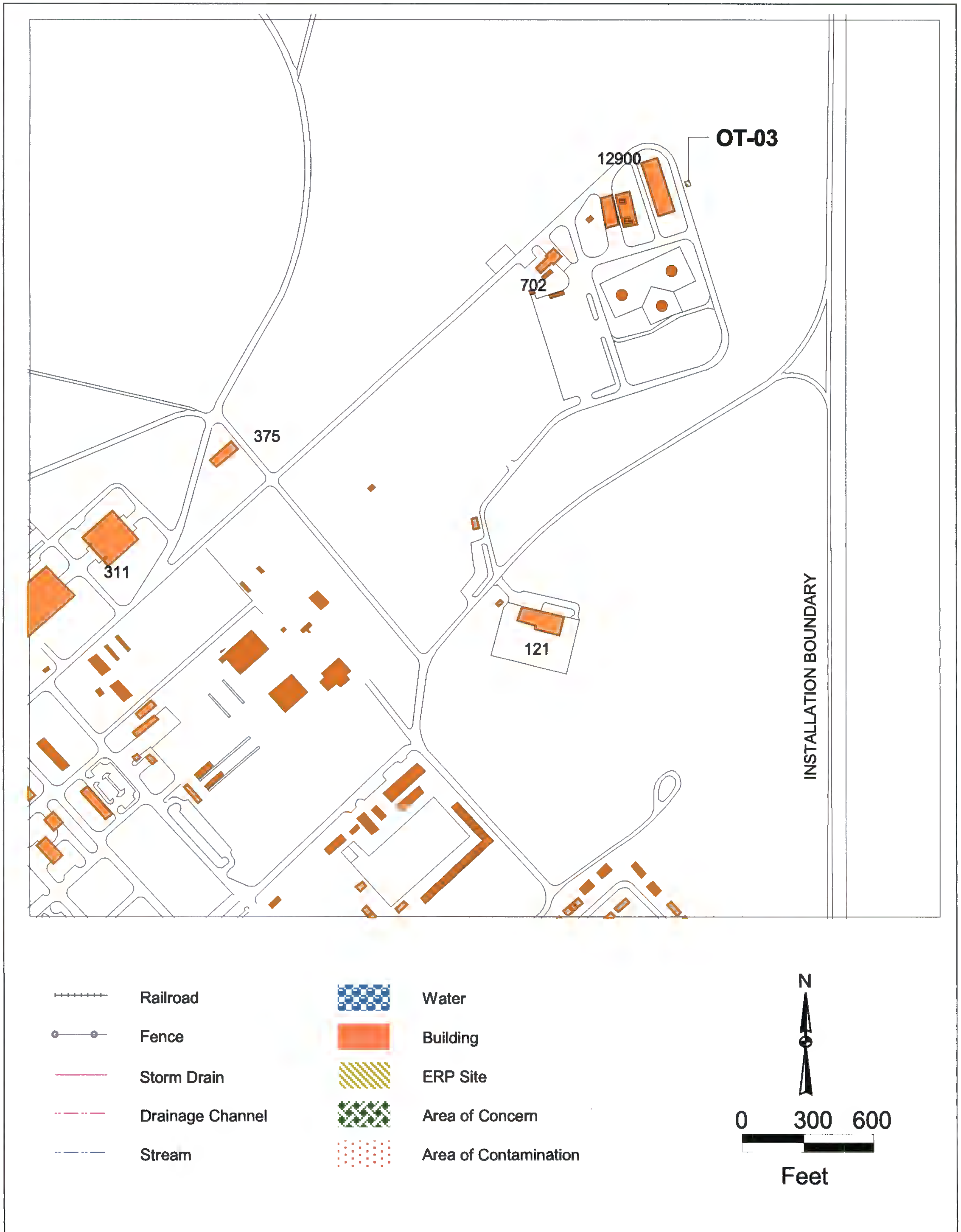


Railroad
Fence
Storm Drain
Drainage Channel
Stream
Water
Building
ERP Site
Area of Concern
Area of Contamination

N

0 600 1200
Feet

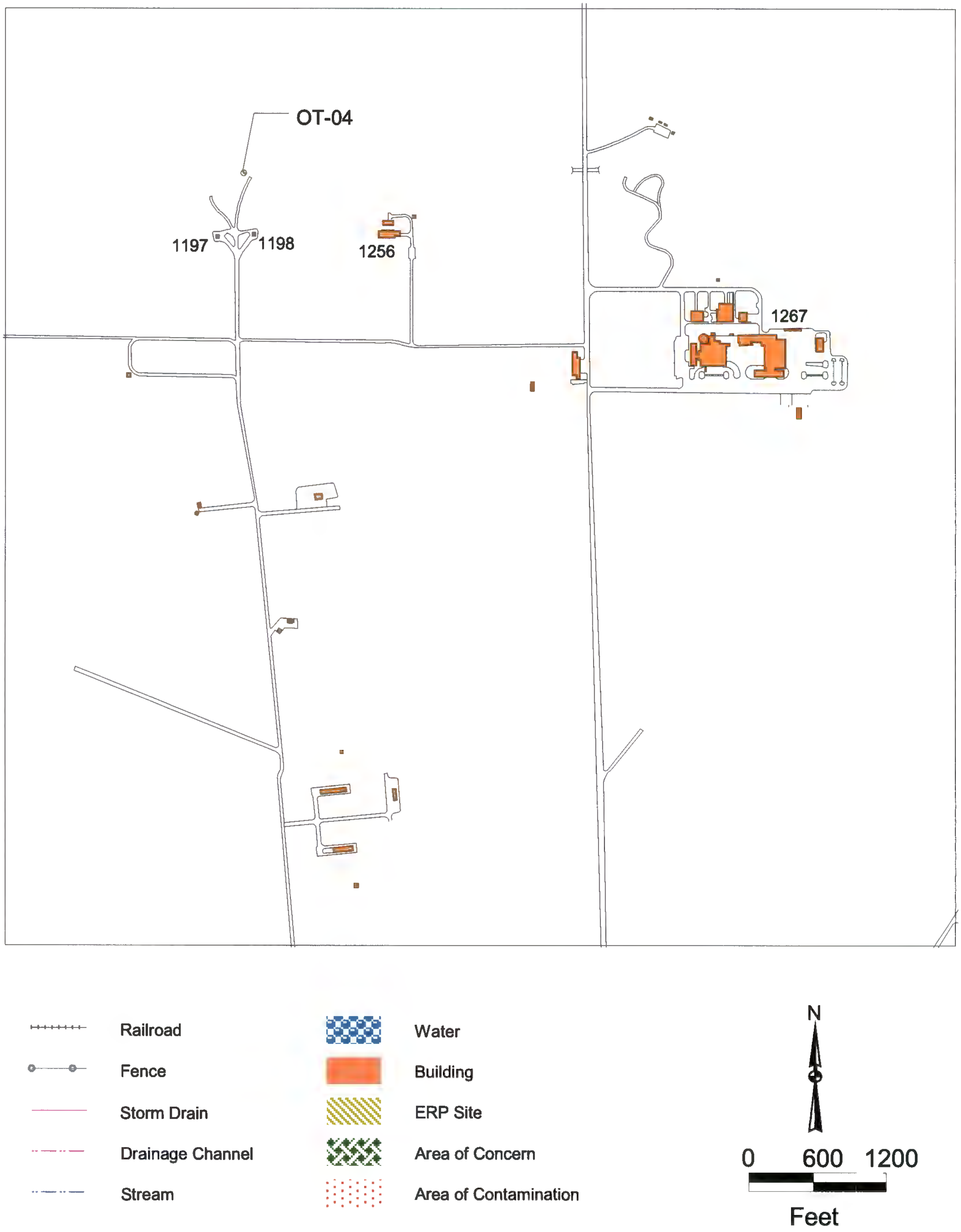
Holloman Air Force Base New Mexico	SS-02, POL SPILL SITE NO.1	Figure C3-2



Holloman Air Force Base
New Mexico

OT-03, POL TANK SLUDGE BURIAL AREA

Figure C3-3



Holloman Air Force Base
New Mexico

OT-04, ACID TRAILER BURIAL

Figure C3-4

Railroad
Fence
Storm Drain
Drainage Channel
Stream

Water
Building
ERP Site
Area of Concern
Area of Contamination

N

0 600 1200

Feet

Holloman Air Force Base New Mexico	SS-05, POL SPILL SITE NO. 5	Figure C3-5

Railroad
Fence
Storm Drain
Drainage Channel
Stream
Water
Building
ERP Site
Area of Concern
Area of Contamination

N
0 600 1200
Feet

Holloman Air Force Base New Mexico	SS-06, FUEL LINE SPILL NO.2	Figure C3-6

Holloman Air Force Base
New Mexico

LF-07, RUBBLE DISPOSAL SITE

Figure C3-7

Holloman Air Force Base New Mexico	SD-08 REFUSE COLLECTION TRUCK WASHRACK	Figure C3-8

Holloman Air Force Base New Mexico	SS-09, WASTE POL DRUM STORAGE/SPILL	Figure C3-9

Holloman Air Force Base New Mexico	LF-10, OLD MAIN BASE LANDFILL	Figure C3-10

Holloman Air Force Base New Mexico	OT-11, MAIN BASE ELECTRICAL SUBSTATION	Figure C3-11

Holloman Air Force Base
New Mexico

SS-12, FUEL LINE SPILL NO.1

Figure C3-12

Holloman Air Force Base New Mexico	SS-13, SODIUM ARSENIC SPILL	Figure C3-13

Railroad	Water
Fence	Building
Storm Drain	ERP Site
Drainage Channel	Area of Concern
Stream	Area of Contamination

N

0 500 1000

Feet

Holloman Air Force Base New Mexico	OT-14, FORMER ENTOMOLOGY SHOP	Figure C3-14

Railroad		Water	
Fence		Building	
Storm Drain		ERP Site	
Drainage Channel		Area of Concern	
Stream		Area of Contamination	

N

0 500 1000

Feet

Holloman Air Force Base New Mexico	SD-15, REFRIGERATION/HEAT SHOP WASHRACK	Figure C3-15

Holloman Air Force Base
New Mexico

OT-16, EXISTING ENTOMOLOGY SHOP

Figure C3-16

Railroad		Water	
Fence		Building	
Storm Drain		ERP Site	
Drainage Channel		Area of Concern	
Stream		Area of Contamination	

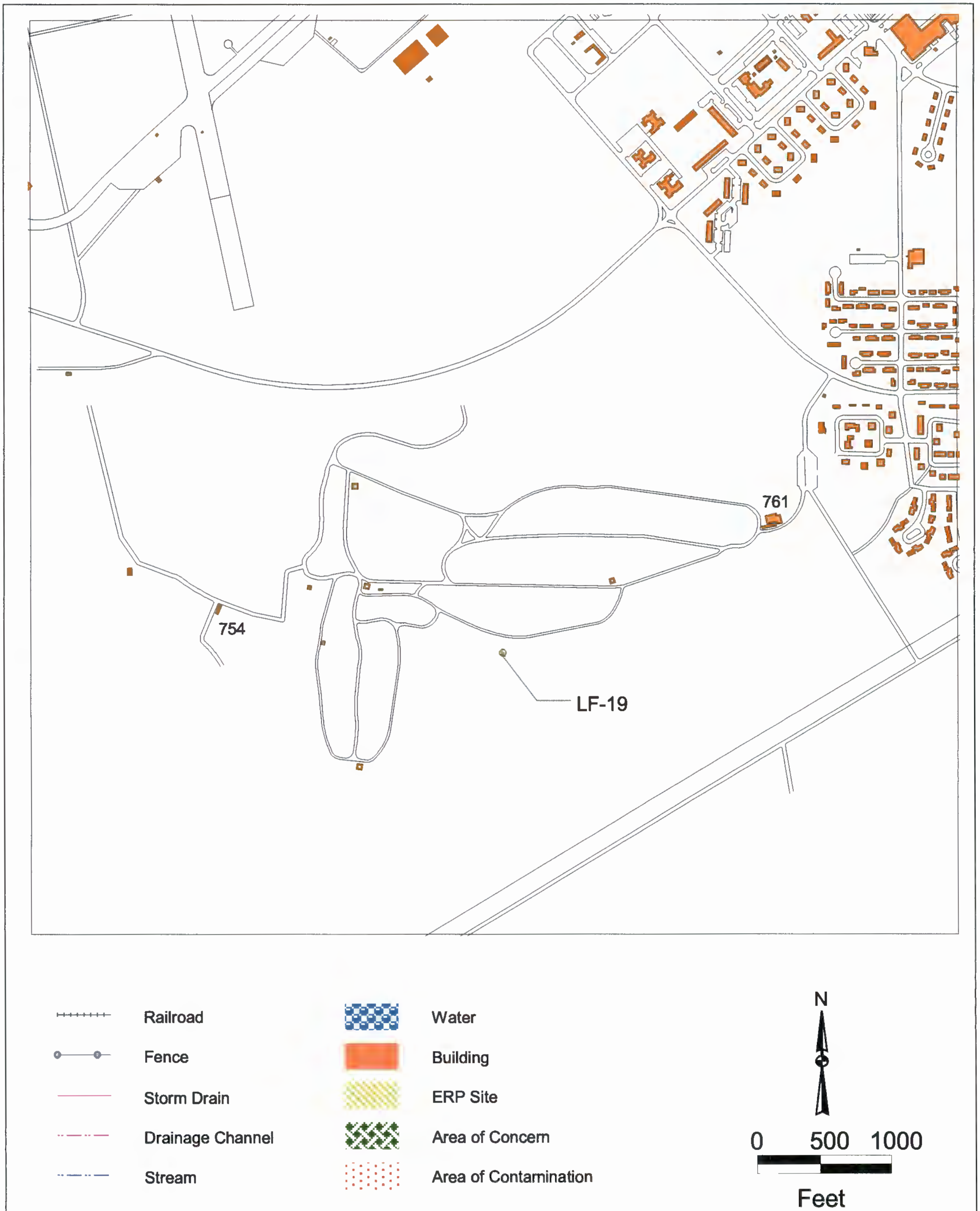
N

0 300 600

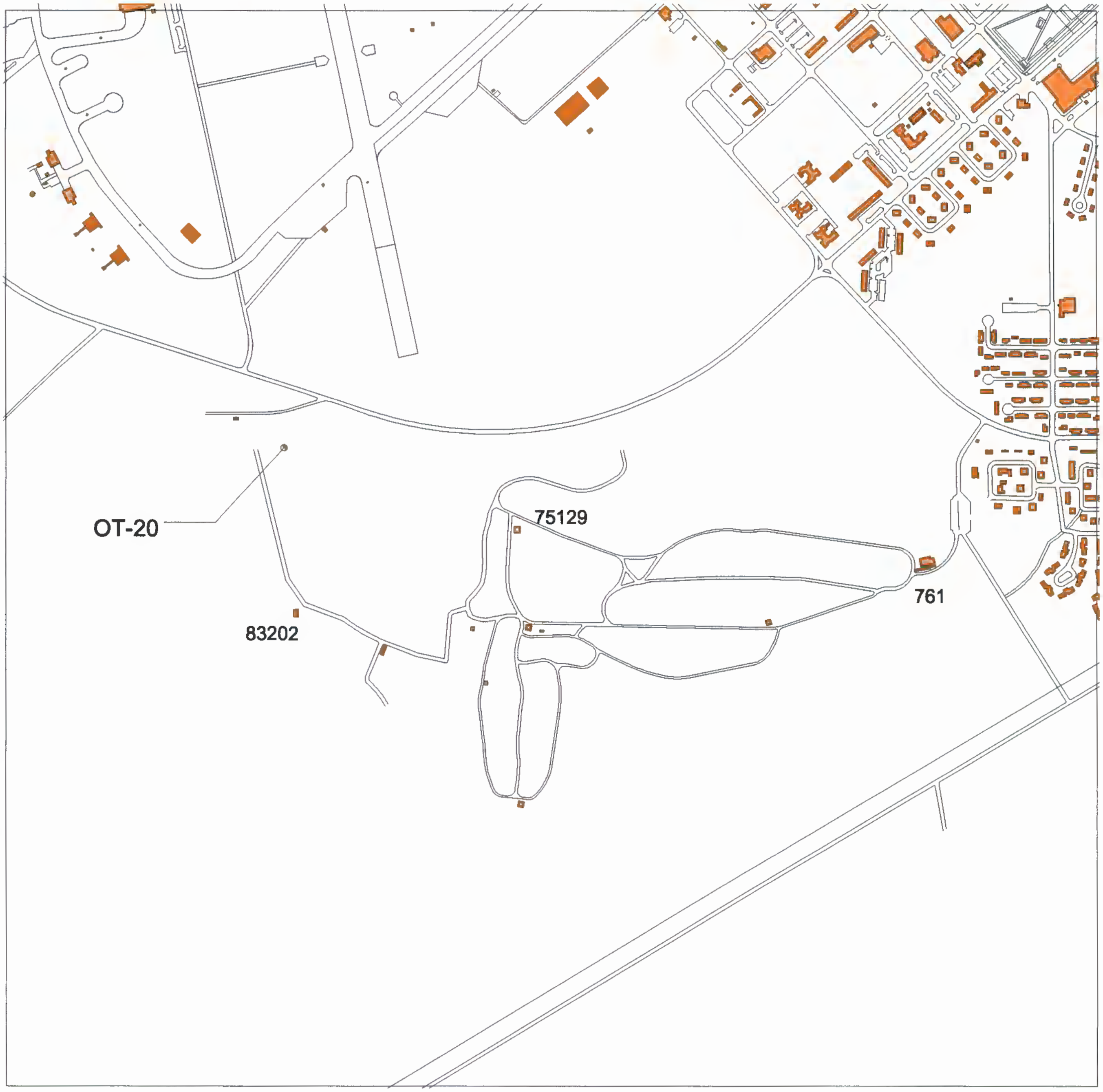
Feet

Holloman Air Force Base New Mexico	SS-17, BX SERVICE STATION FUEL LEAK	Figure C3-17

Holloman Air Force Base New Mexico	SS-18, CHROMIC ACID SPILL SITE	Figure C3-18



Holloman Air Force Base New Mexico	LF-19, GOLF COURSE LANDFILL	Figure C3-19



Legend			
Railroad		Water	
Fence		Building	
Storm Drain		ERP Site	
Drainage Channel		Area of Concern	
Stream		Area of Contamination	

N

0 600 1200

Feet

Holloman Air Force Base New Mexico	OT-20, GRIT BURIAL SITE	Figure C3-20

Holloman Air Force Base New Mexico	LF-21, WEST AREA LANDFILL NO. 2	Figure C3-21

Holloman Air Force Base
New Mexico

LF-22, WEST AREA LANDFILL NO. 1

Figure C3-22

Holloman Air Force Base New Mexico	LF-23, MOBSS LANDFILL	Figure C3-23

Holloman Air Force Base New Mexico	OT-24, FORMER EQUIPMENT MAINTENANCE AREA	Figure C3-24

Holloman Air Force Base
New Mexico

SD-25, DRAINAGE LAGOON DISPOSAL

Figure C3-25

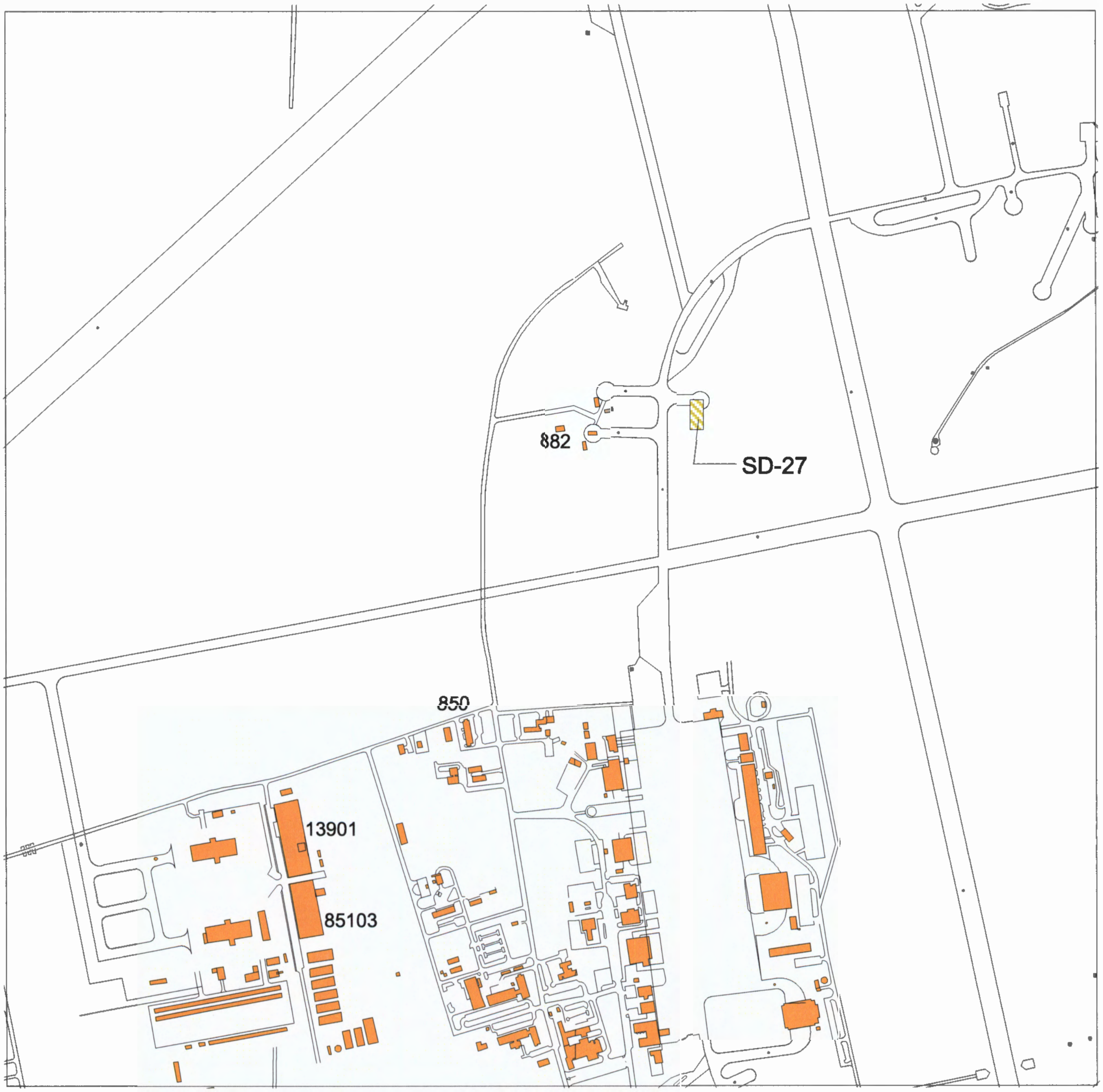
Railroad	Water	
Fence	Building	
Storm Drain	ERP Site	
Drainage Channel	Area of Concern	
Stream	Area of Contamination	

N

0 300 600

Feet

Holloman Air Force Base New Mexico	SS-26, POSSIBLE MISSILE FUEL SPILL SITE	Figure C3-26



Railroad		Water	
Fence		Building	
Storm Drain		ERP Site	
Drainage Channel		Area of Concern	
Stream		Area of Contamination	

N

0 300 600

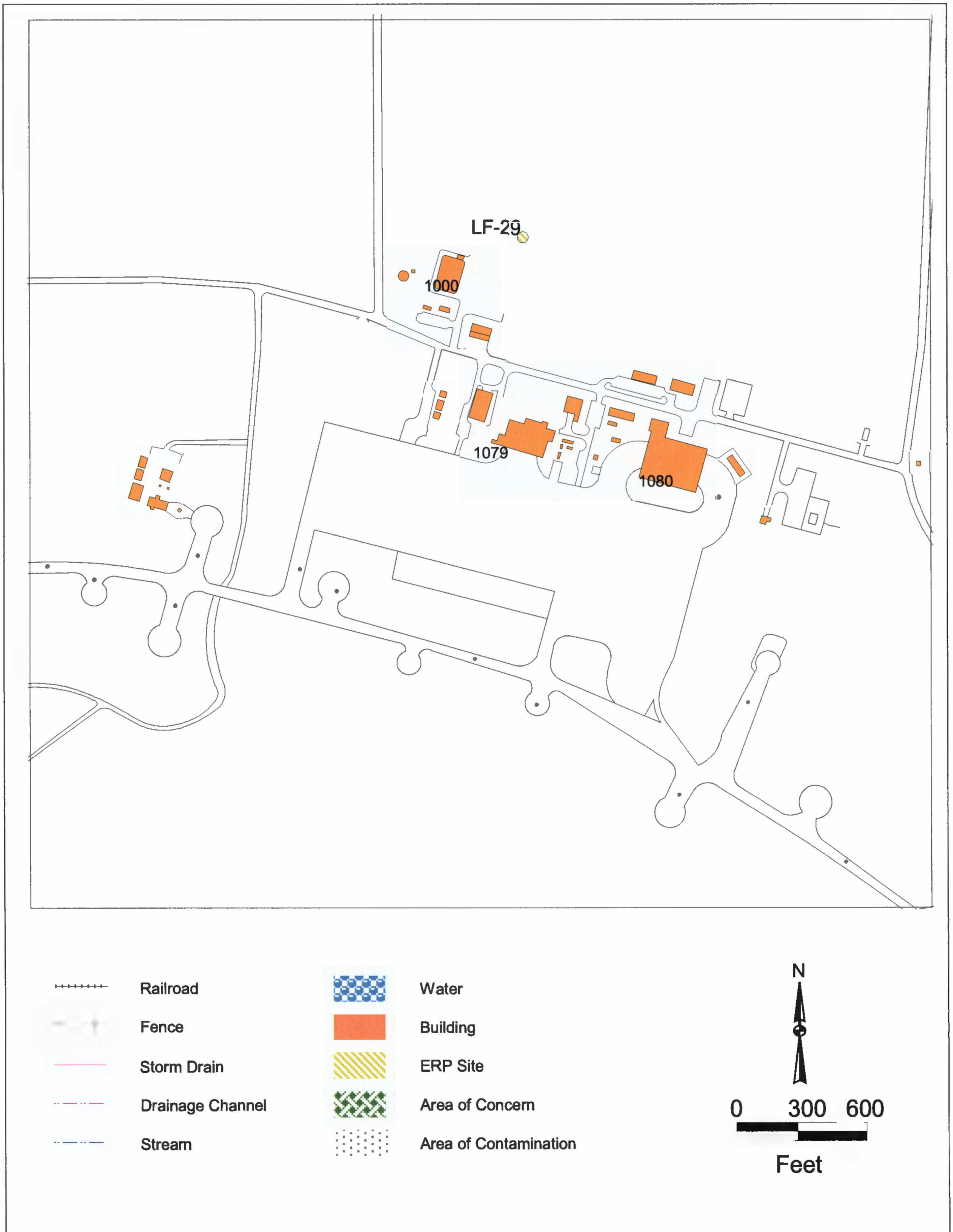
Feet

Holloman Air Force Base New Mexico	SD-27, PAD 9 WASHRACK	Figure C3-27

Holloman Air Force Base
New Mexico

SD-28, NORTH AREA WASHRACK

Figure C3-28

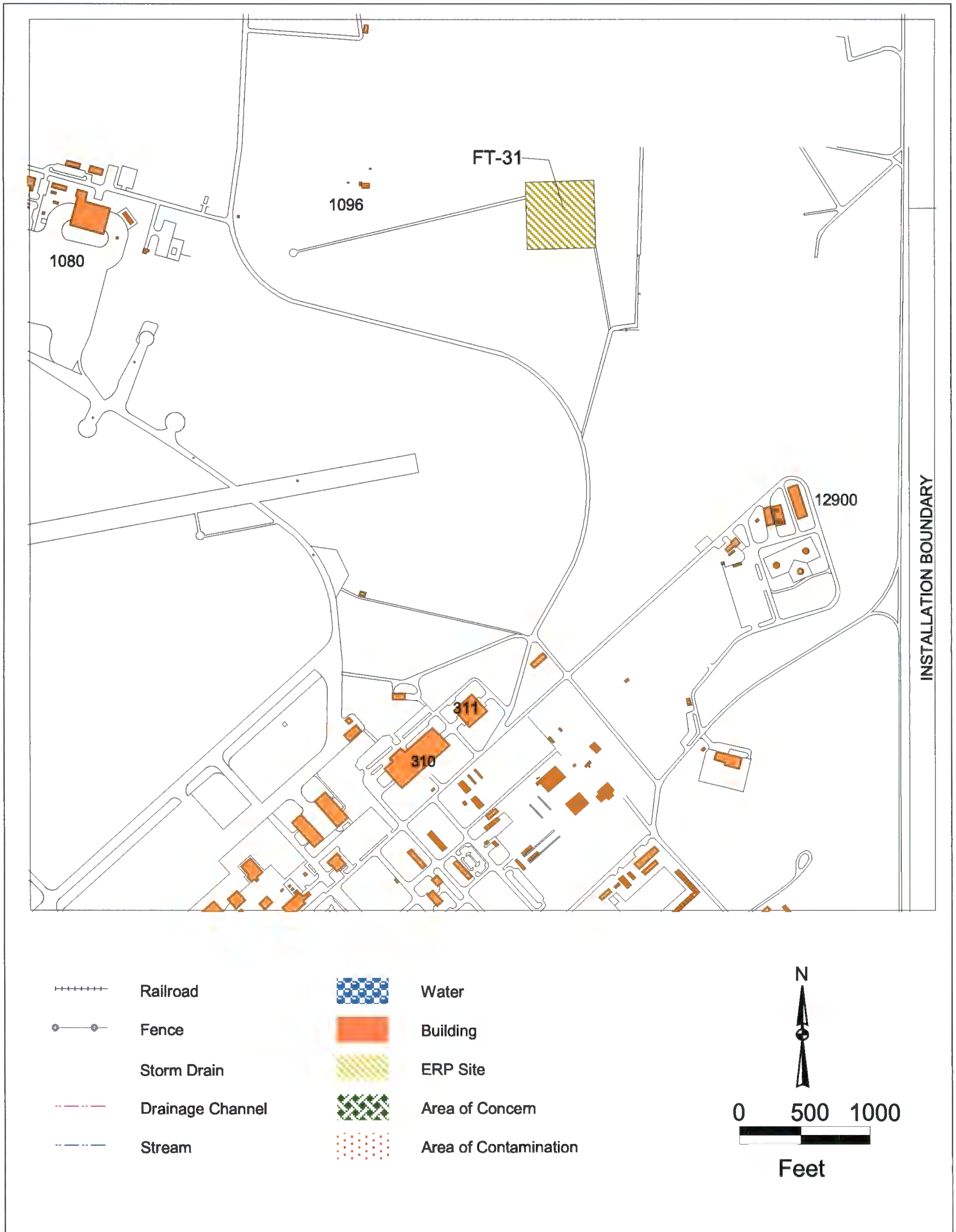


Holloman Air Force Base
New Mexico

LF-29, FORMER ARMY LANDFILL

Figure C3-29

Holloman Air Force Base New Mexico	DP-30, GREASE TRAP DISPOSAL PITS	Figure C3-30

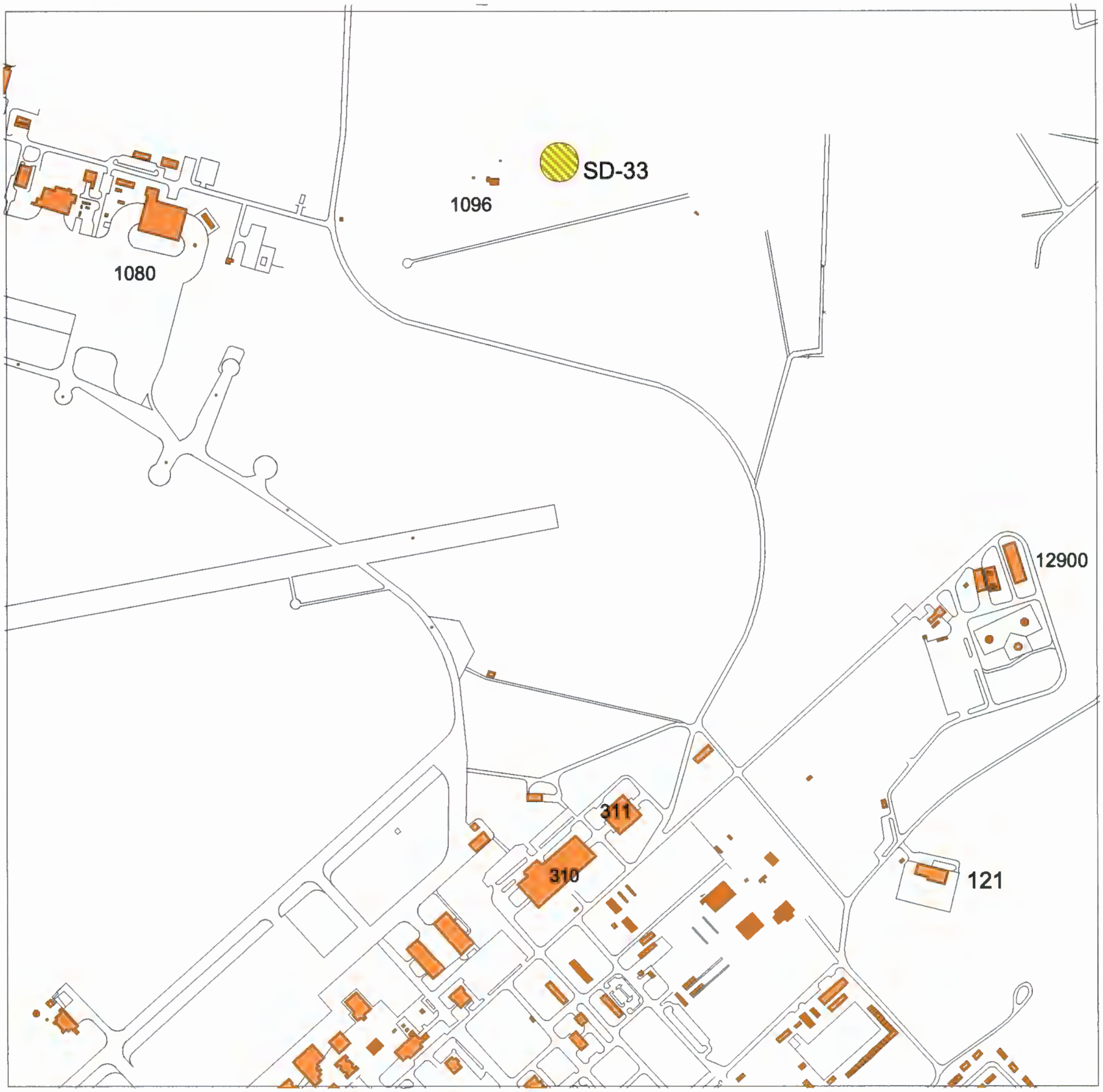


Holloman Air Force Base
New Mexico

FT-31, FIRE DEPT. TRAINING AREA

Figure C3-31

Holloman Air Force Base New Mexico	OT-32, SEWER LINES FROM PRI	Figure C3-32



Railroad

Fence

Storm Drain

Drainage Channel

Stream

Water

Building

ERP Site

Area of Concern

Area of Contamination

N

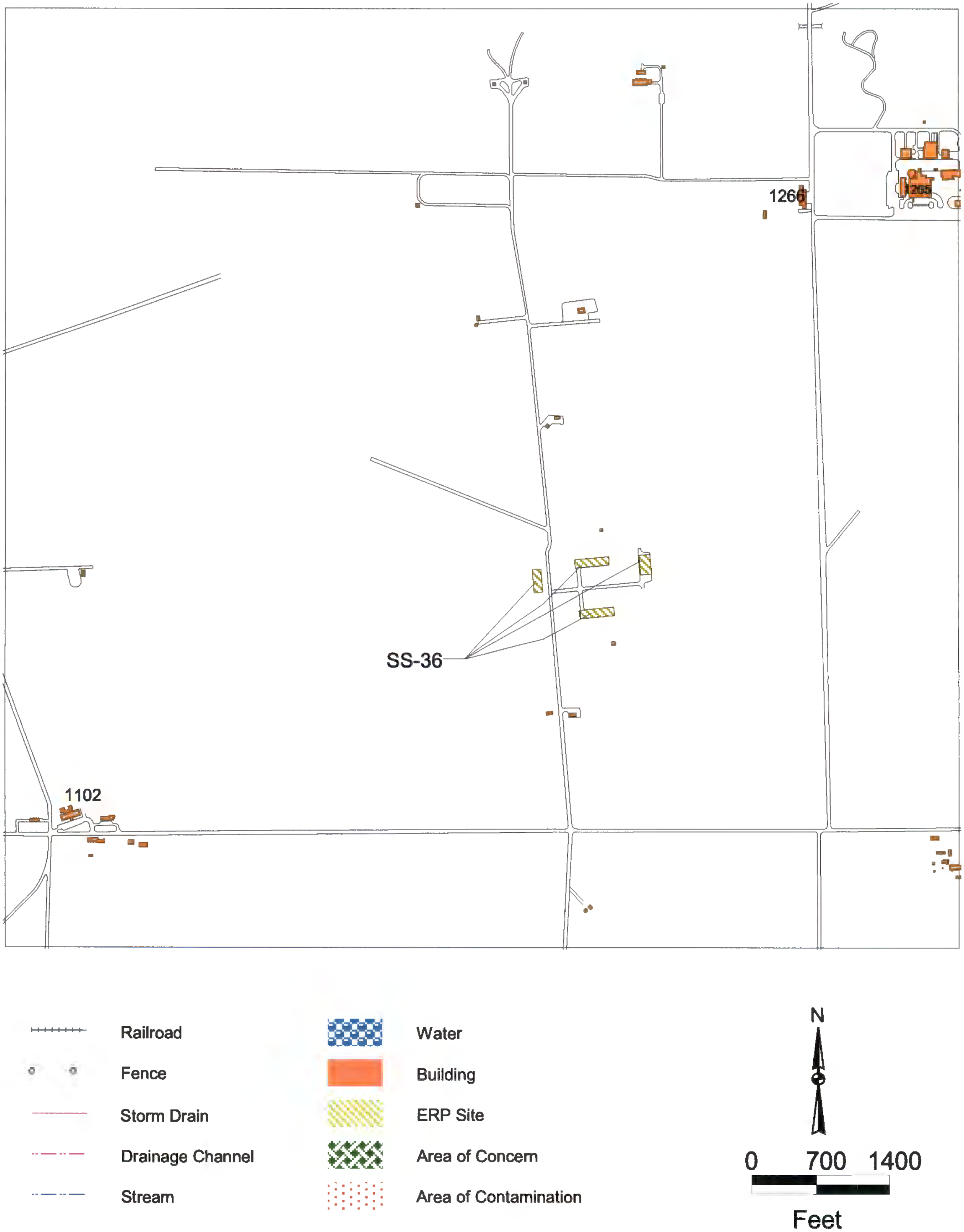
0 500 1000

Feet

Holloman Air Force Base New Mexico	SD-33, COOKING GREASE DISPOSAL PITS	Figure C3-33

Holloman Air Force Base New Mexico	OT-34, SPENT MUNITIONS BURIAL SITE	Figure C3-34

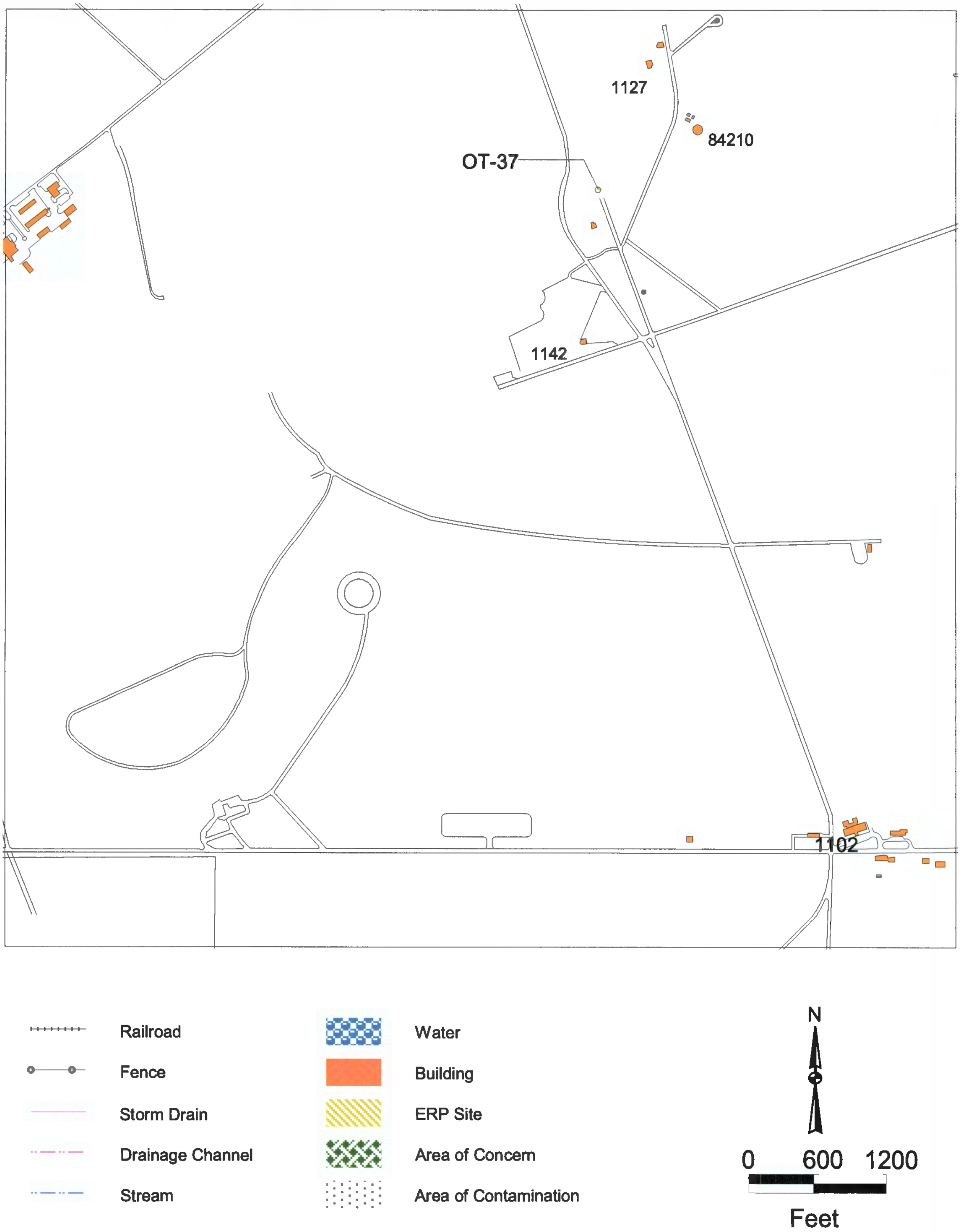
Holloman Air Force Base New Mexico	OT-35, SPENT SOLVENT DISPOSAL AREA	Figure C3-35



Holloman Air Force Base
New Mexico

SS-36, UNCONVENTIONAL FUELS AREA SPILL

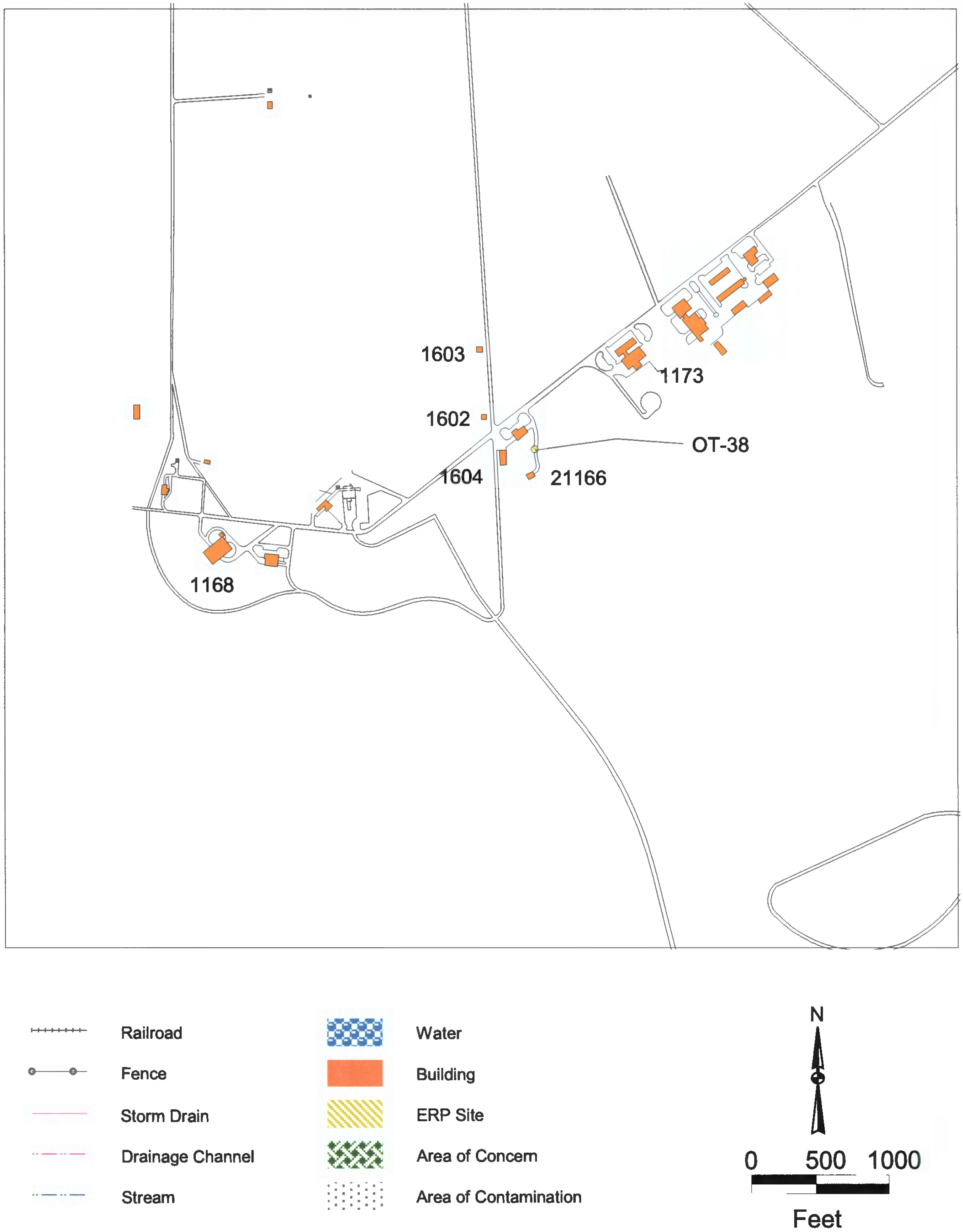
Figure C3-36



Holloman Air Force Base
New Mexico

OT-37, EARLY MISSILE TESTING AREA

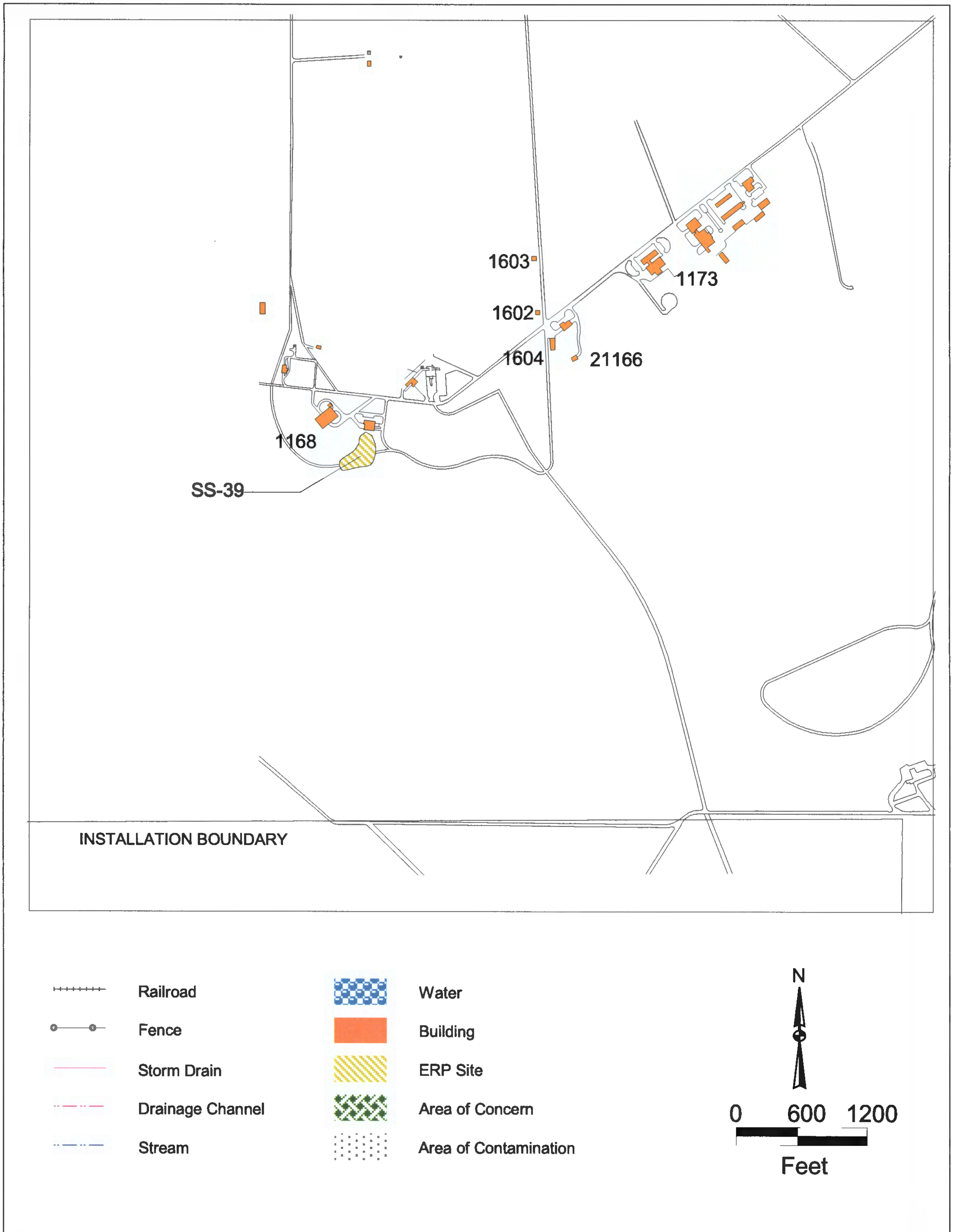
Figure C3-37



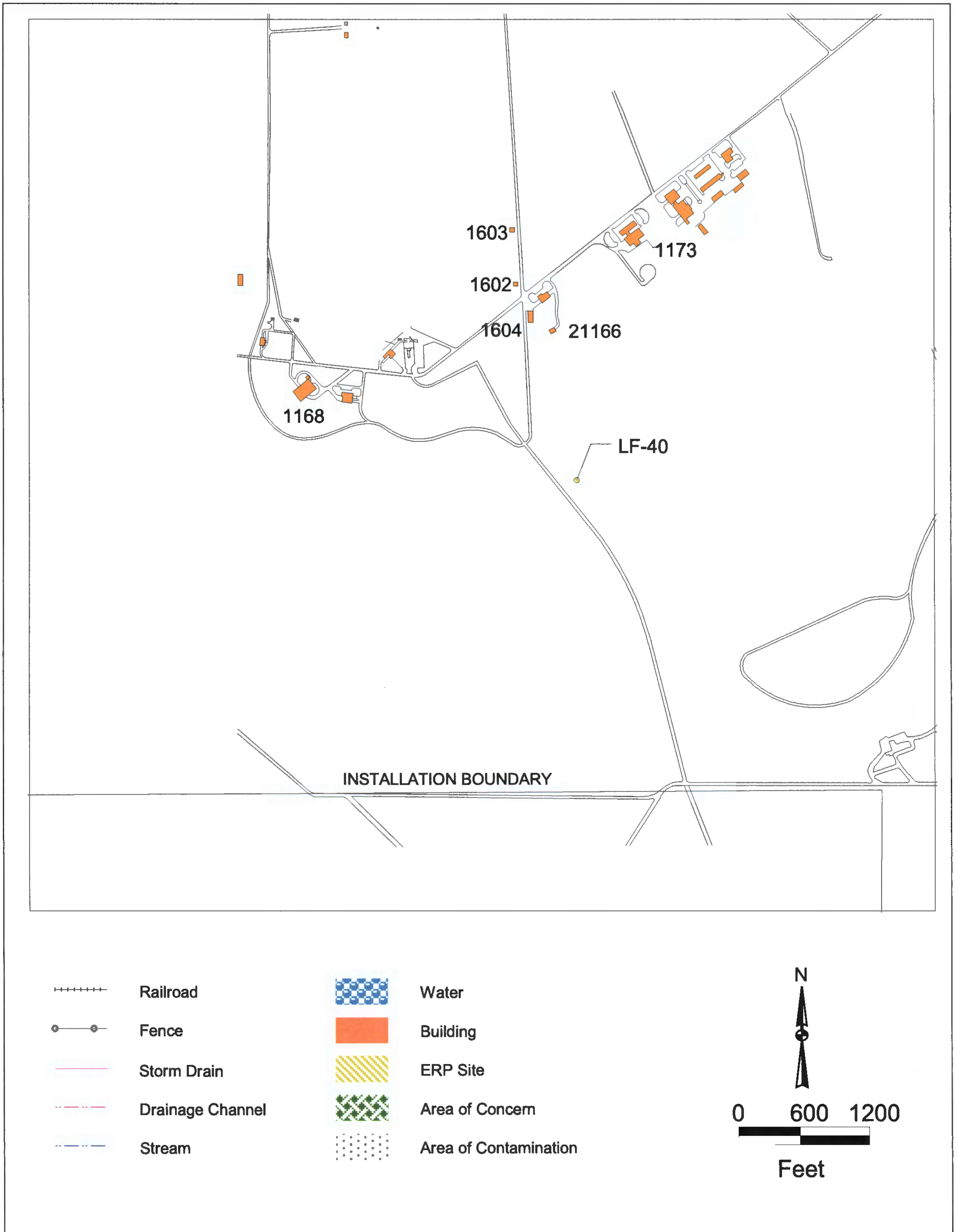
Holloman Air Force Base
New Mexico

OT-38, SLED TEST MAINTENANCE AREA

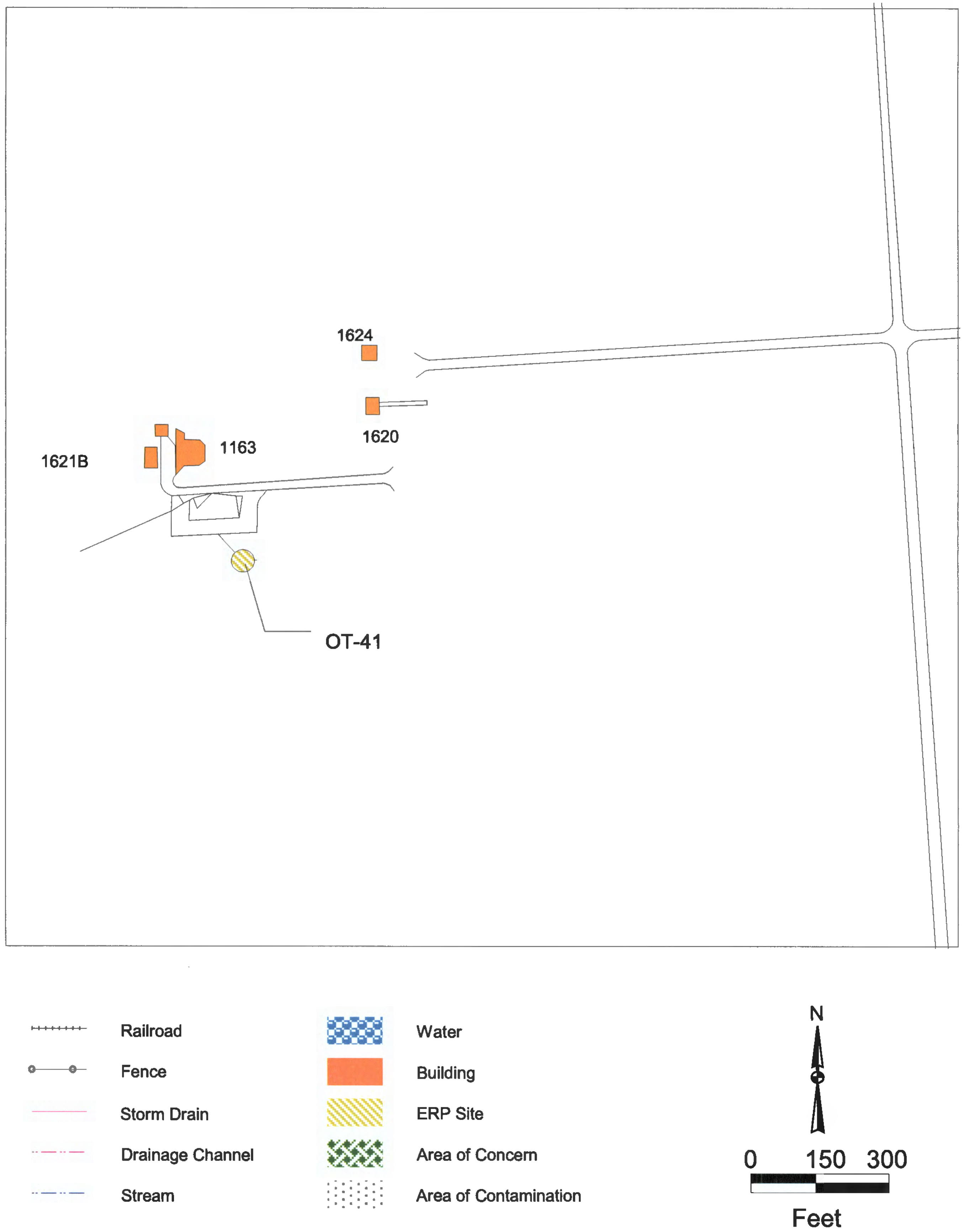
Figure C3-38



Holloman Air Force Base New Mexico	SS-39, MISSILE FUEL SPILL AREA	Figure C3-39



Holloman Air Force Base New Mexico	LF-40, CAUSEWAY RUBBLE DISPOSAL SITE	Figure C3-40

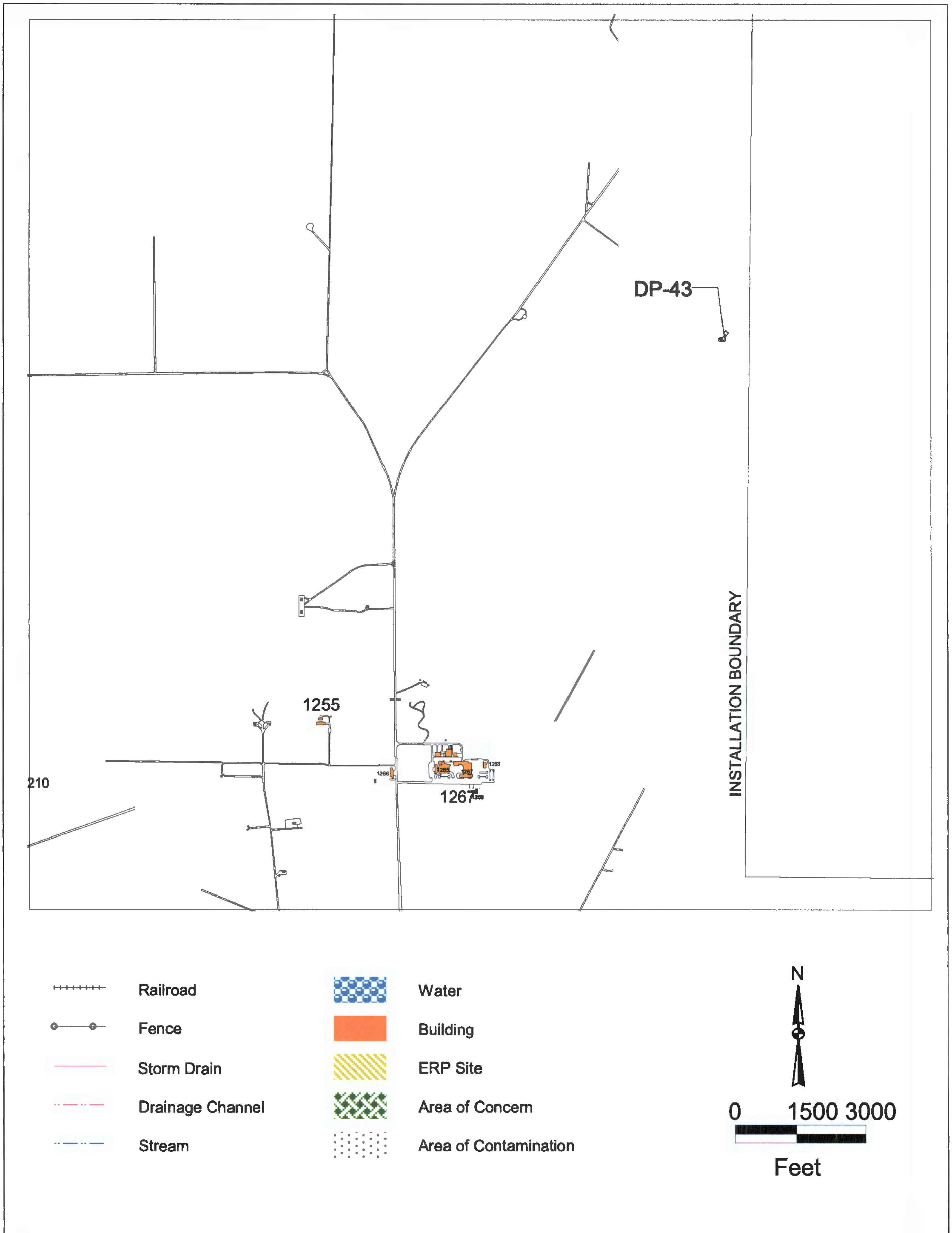


Holloman Air Force Base
New Mexico

OT-41, COCO BLOCKHOUSE DISPOSAL SITE

Figure C3-41

Holloman Air Force Base New Mexico	RW-42, RADIOACTIVE MATERIAL BURIAL SITE	Figure C3-42



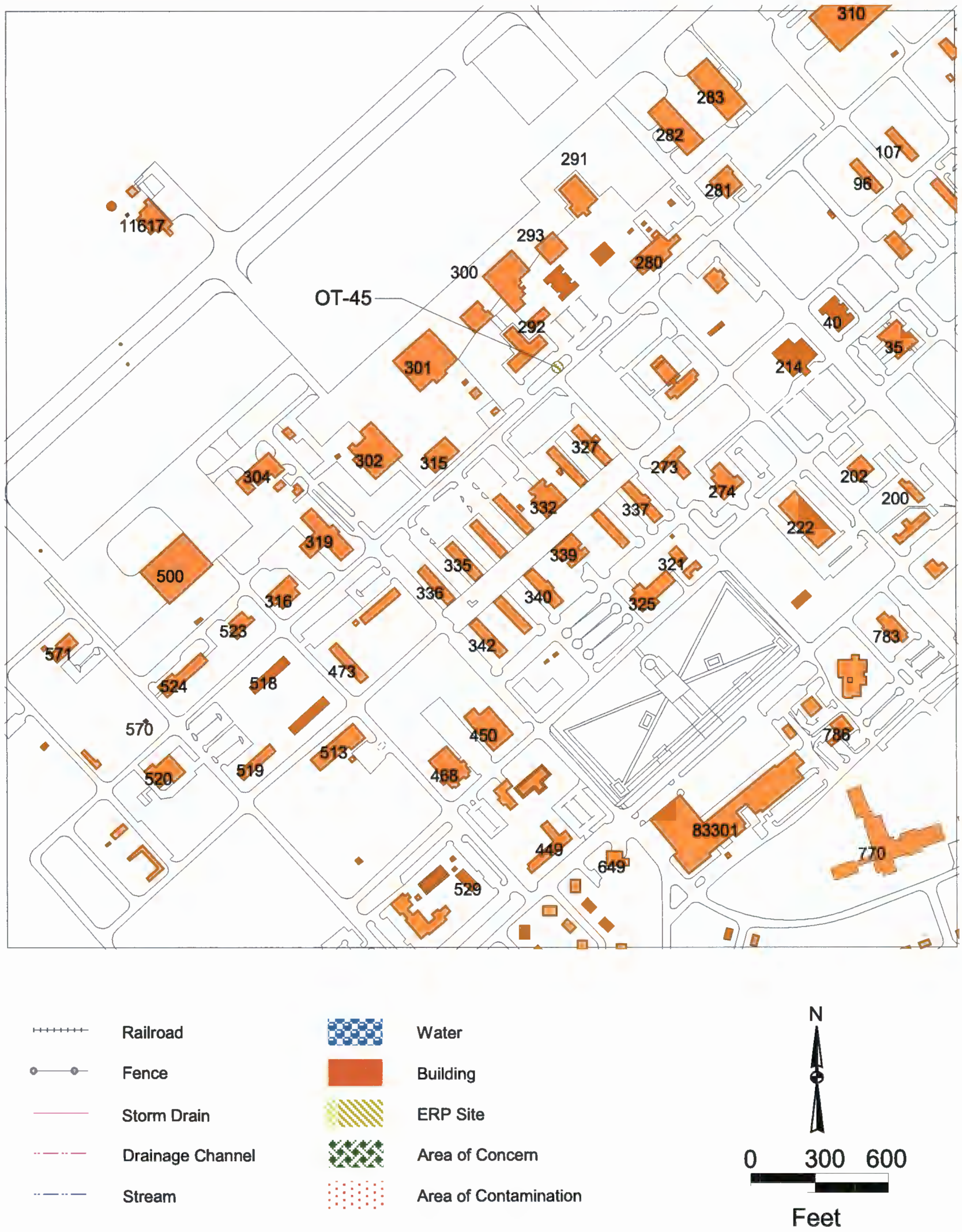
Holloman Air Force Base New Mexico	DP-43, ATLAS ELECTRICAL SUBSTATION	Figure C3-43

Railroad
Fence
Storm Drain
Drainage Channel
Stream
Water
Building
ERP Site
Area of Concern
Area of Contamination

N

0 300 600
Feet

Holloman Air Force Base New Mexico	OT-44, BLDG. 301-AIRCRAFT MAINTENANCE	Figure C3-44



Holloman Air Force Base New Mexico	OT-45, OLD AGE REFUELING STATION	Figure C3-45

Holloman Air Force Base
New Mexico

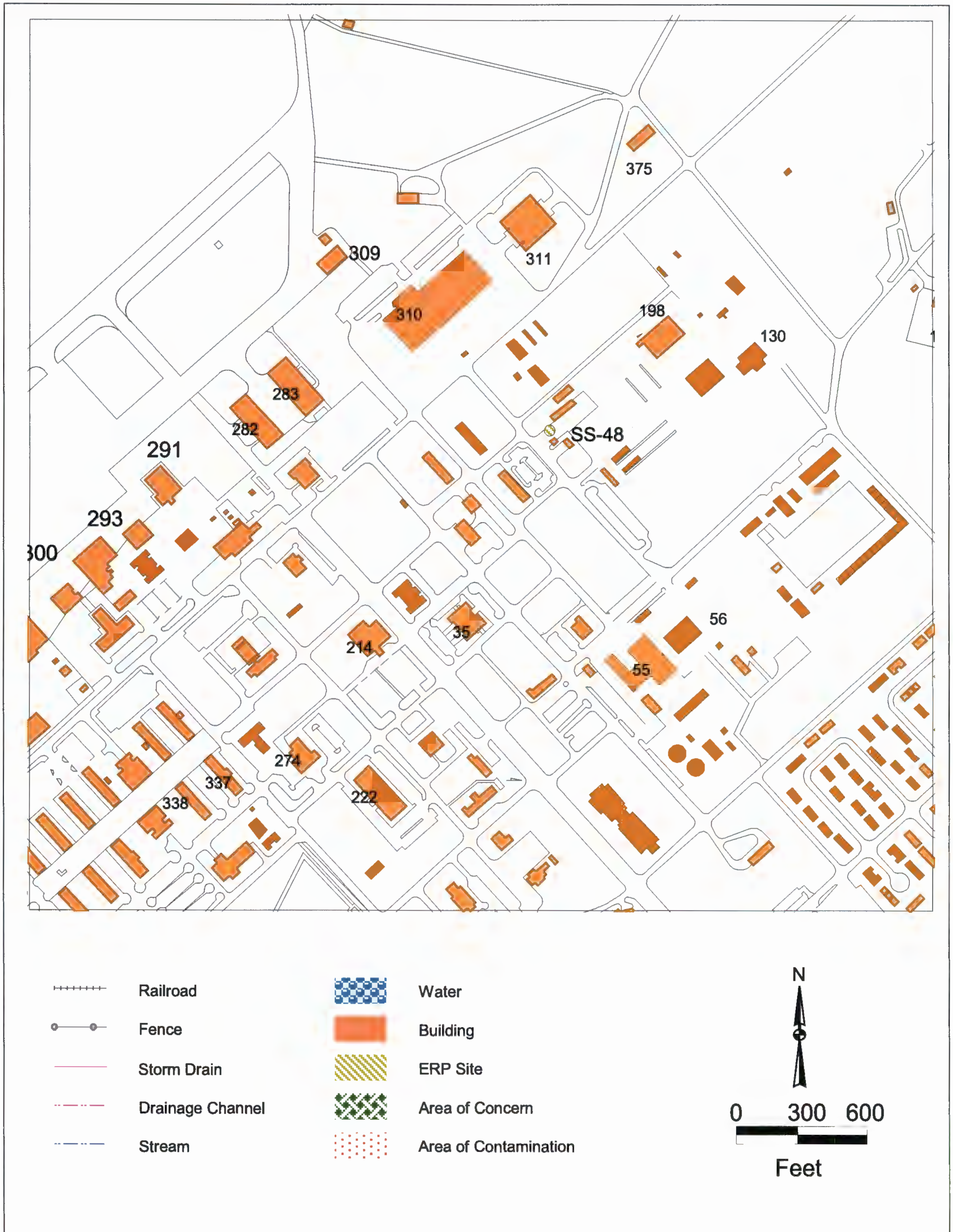
SS-46, JP-4 SPILL SITE

Figure C3-46

Holloman Air Force Base
New Mexico

SD-47, POL WASHRACK DISCHARGE AREA

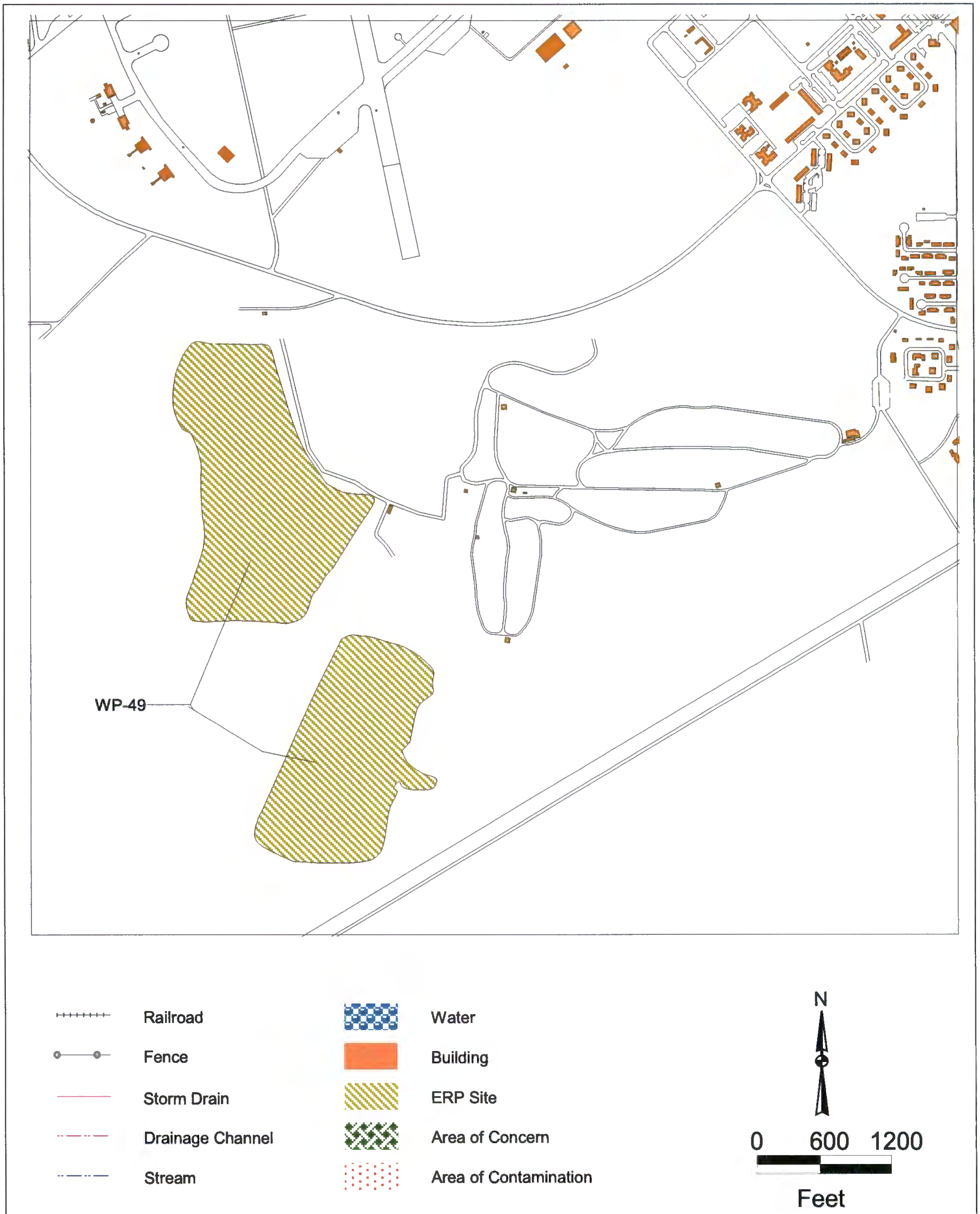
Figure C3-47



Holoman Air Force Base
New Mexico

SS-48, MILITARY GAS STATION

Figure C3-48



Holloman Air Force Base
New Mexico

WP-49, SEWAGE LAGOONS

Figure C3-49

Railroad
Fence
Storm Drain
Drainage Channel
Stream
Water
Building
ERP Site
Area of Concern
Area of Contamination

N

0 1500 3000

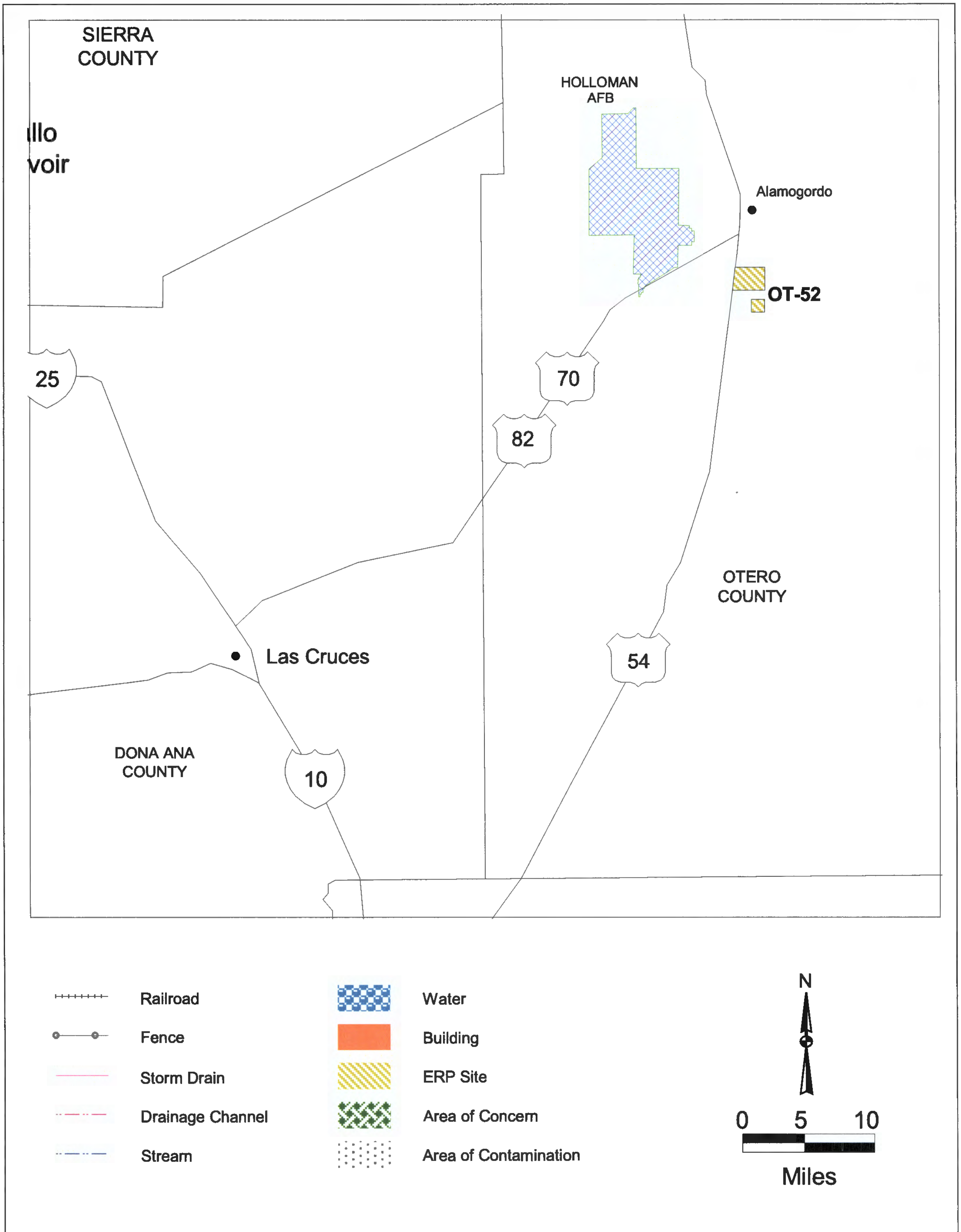
Feet

Holloman Air Force Base New Mexico	WP-50, WASTE DISPOSAL PIT	Figure C3-50

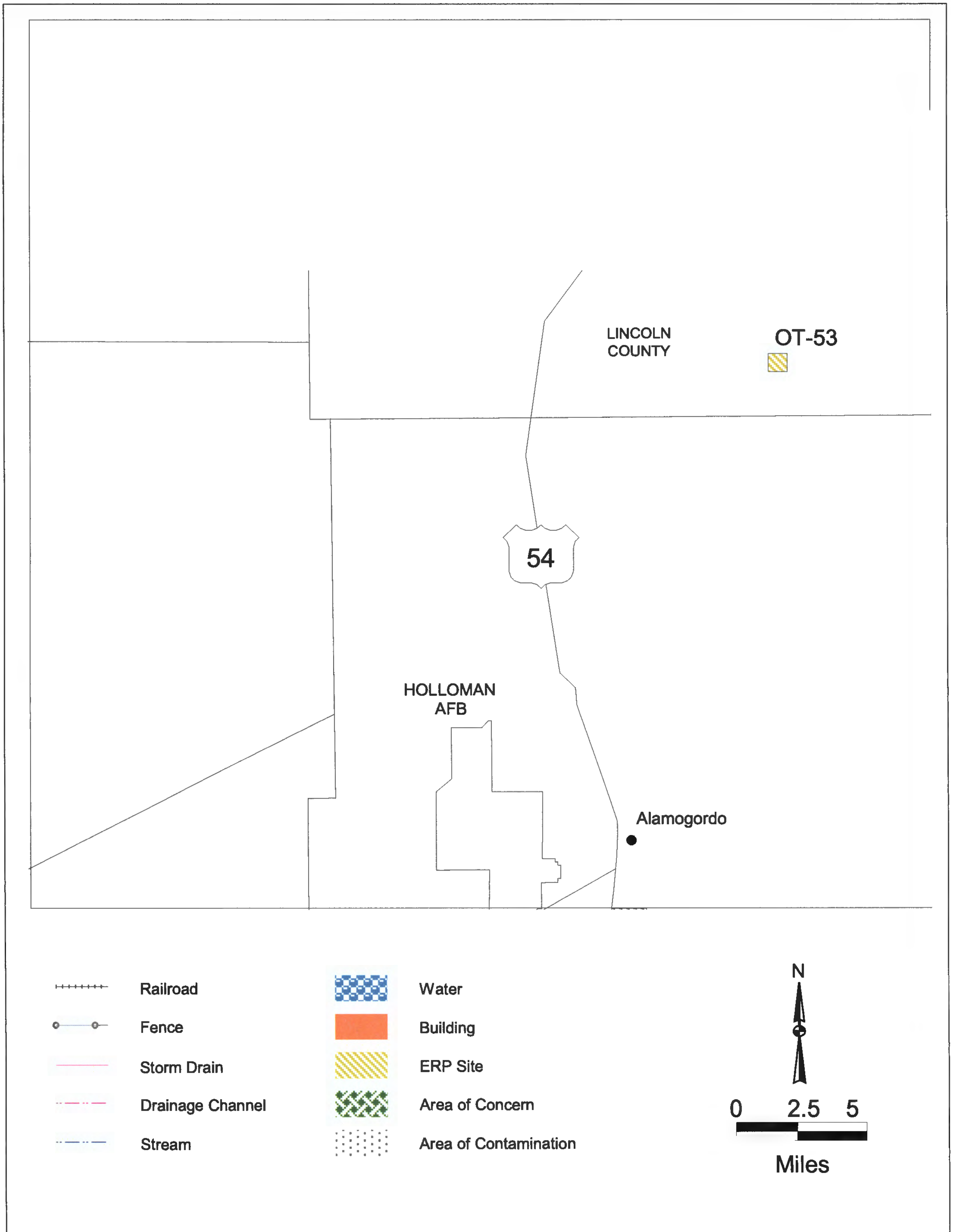
Holloman Air Force Base
New Mexico

RW-51, PRIMATE RESEARCH LAB DISPOSAL

Figure C3-51



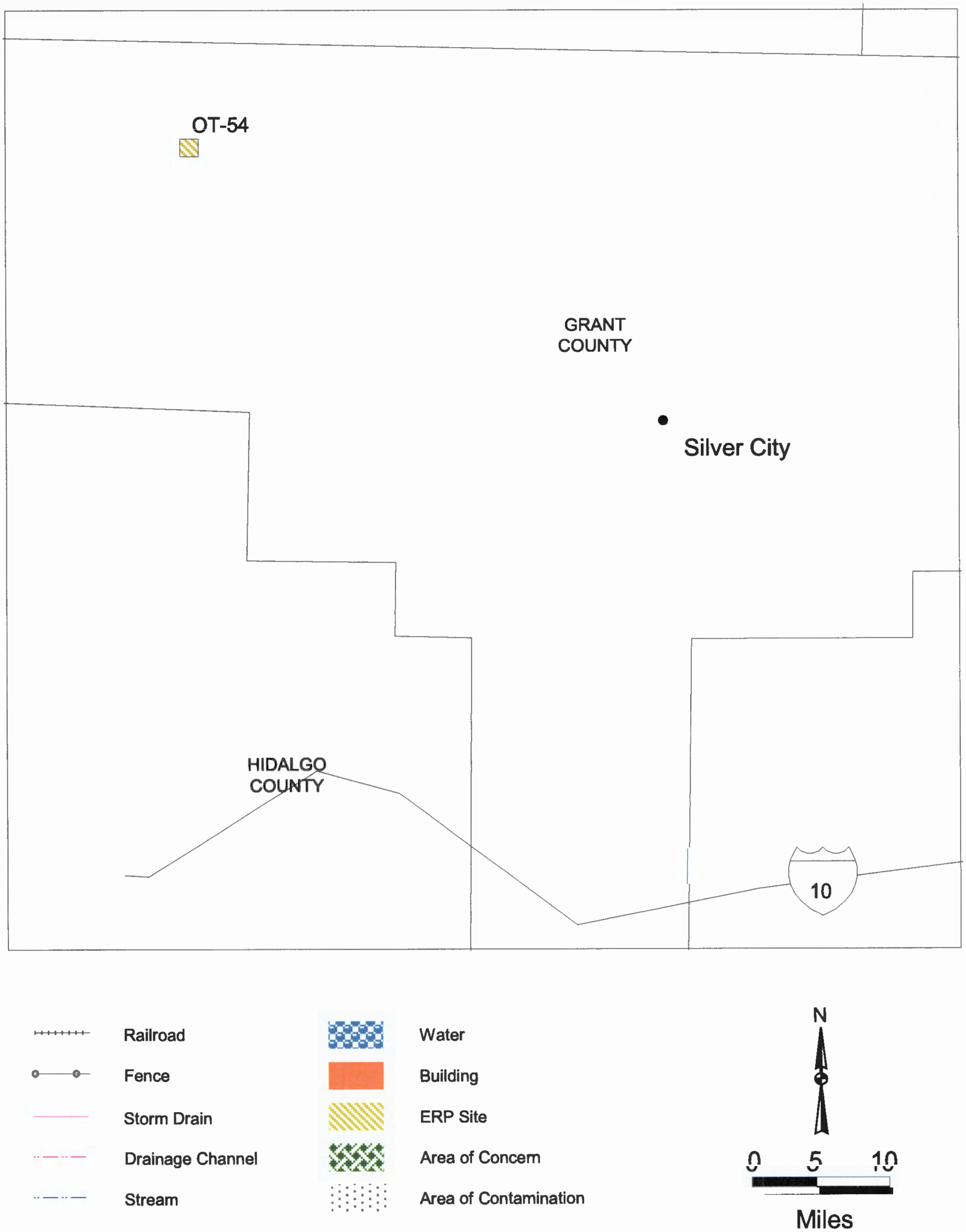
Holloman Air Force Base New Mexico	OT-52, BOLES AND SAN ANDRES WELL FIELD AREA	Figure C3-52



Holloman Air Force Base
New Mexico

OT-53, BONITO LAKE

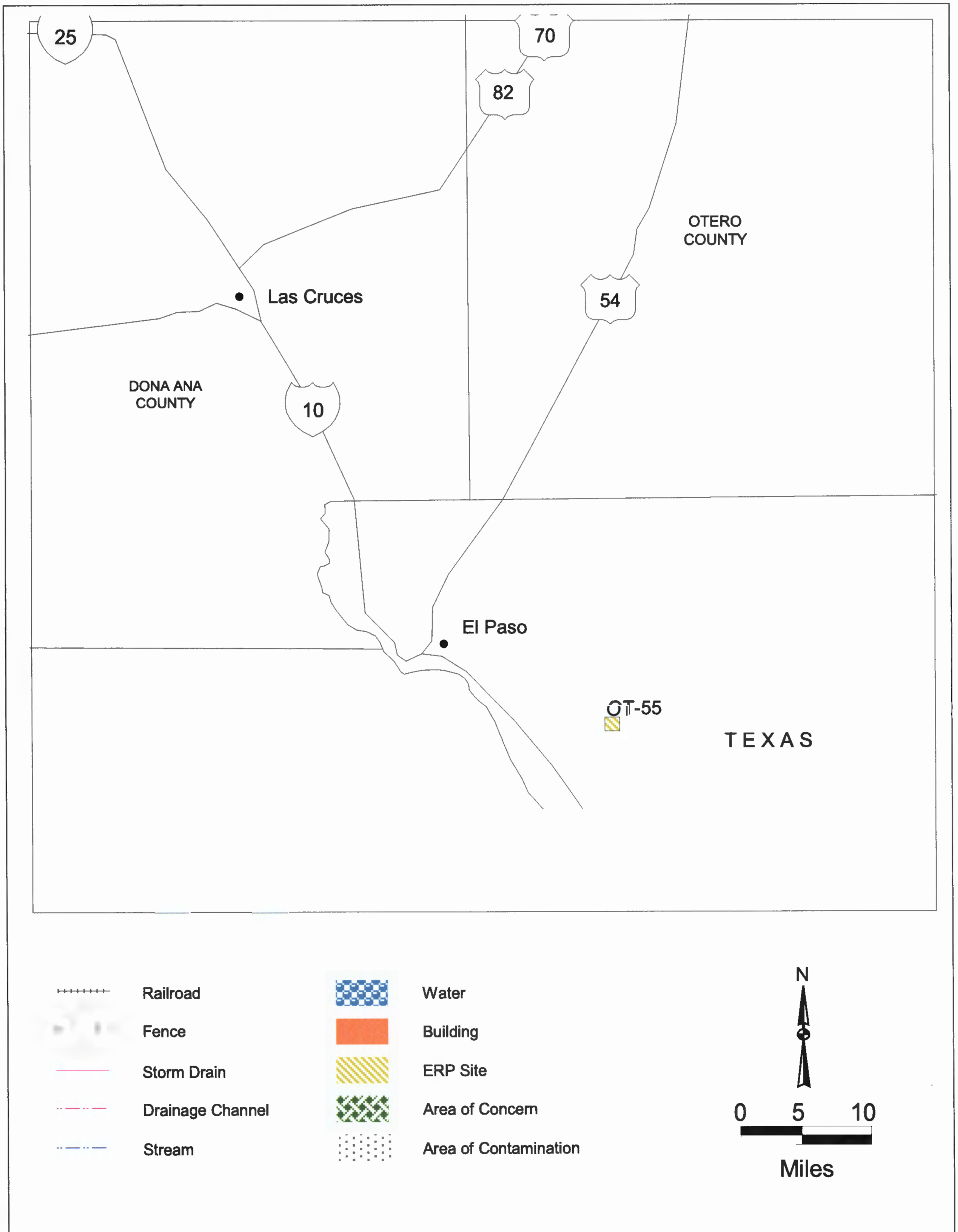
Figure C3-53



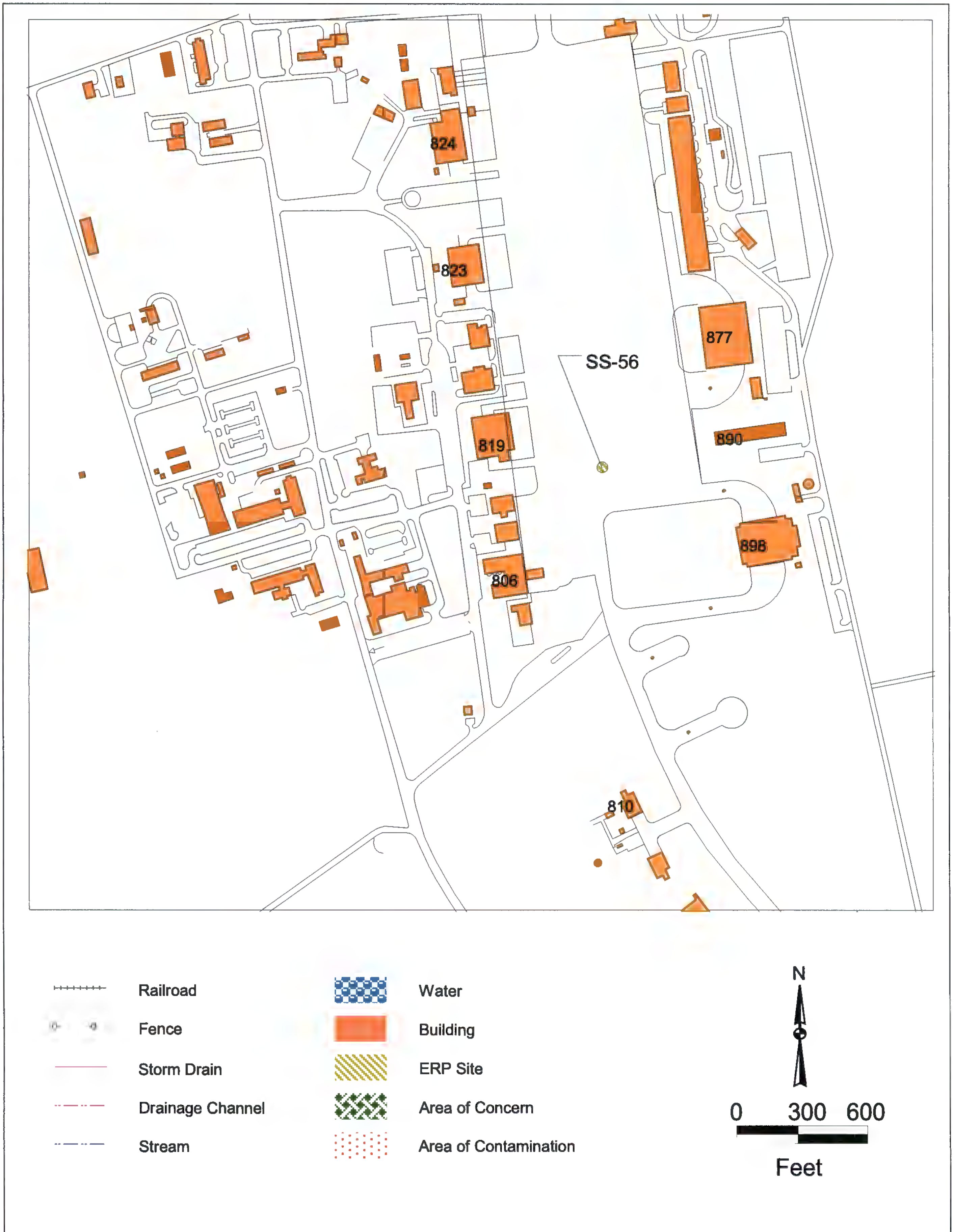
Holloman Air Force Base
New Mexico

OT-54, SILVER CITY RADAR SITE

Figure C3-54



Holloman Air Force Base New Mexico	OT-55, EL PASO RADAR SITE	Figure C3-55



Holloman Air Force Base New Mexico	SS-56, WEST RAMP FUEL SPILL	Figure C3-56

	Railroad		Water
	Fence		Building
	Storm Drain		ERP Site
	Drainage Channel		Area of Concern
	Stream		Area of Contamination

N

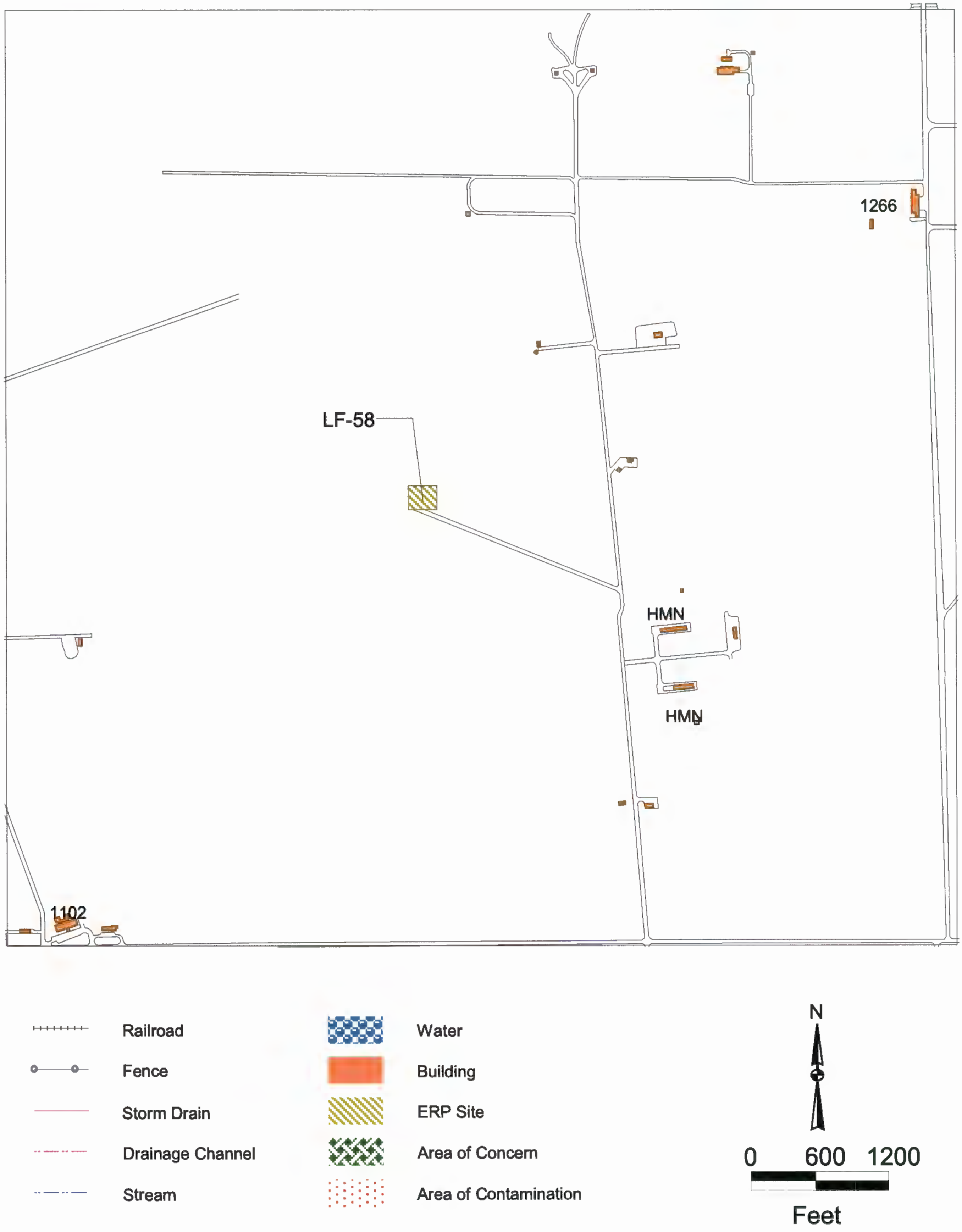
0 300 600

Feet

Holloman Air Force Base
New Mexico

SS-57, OFFICER'S CLUB

Figure C3-57



Holloman Air Force Base
New Mexico

LF-58, INCINERATOR LANDFILL

Figure C3-58

Holloman Air Force Base
New Mexico

SS-59, T-38 TEST CELL FUEL SPILL SITE

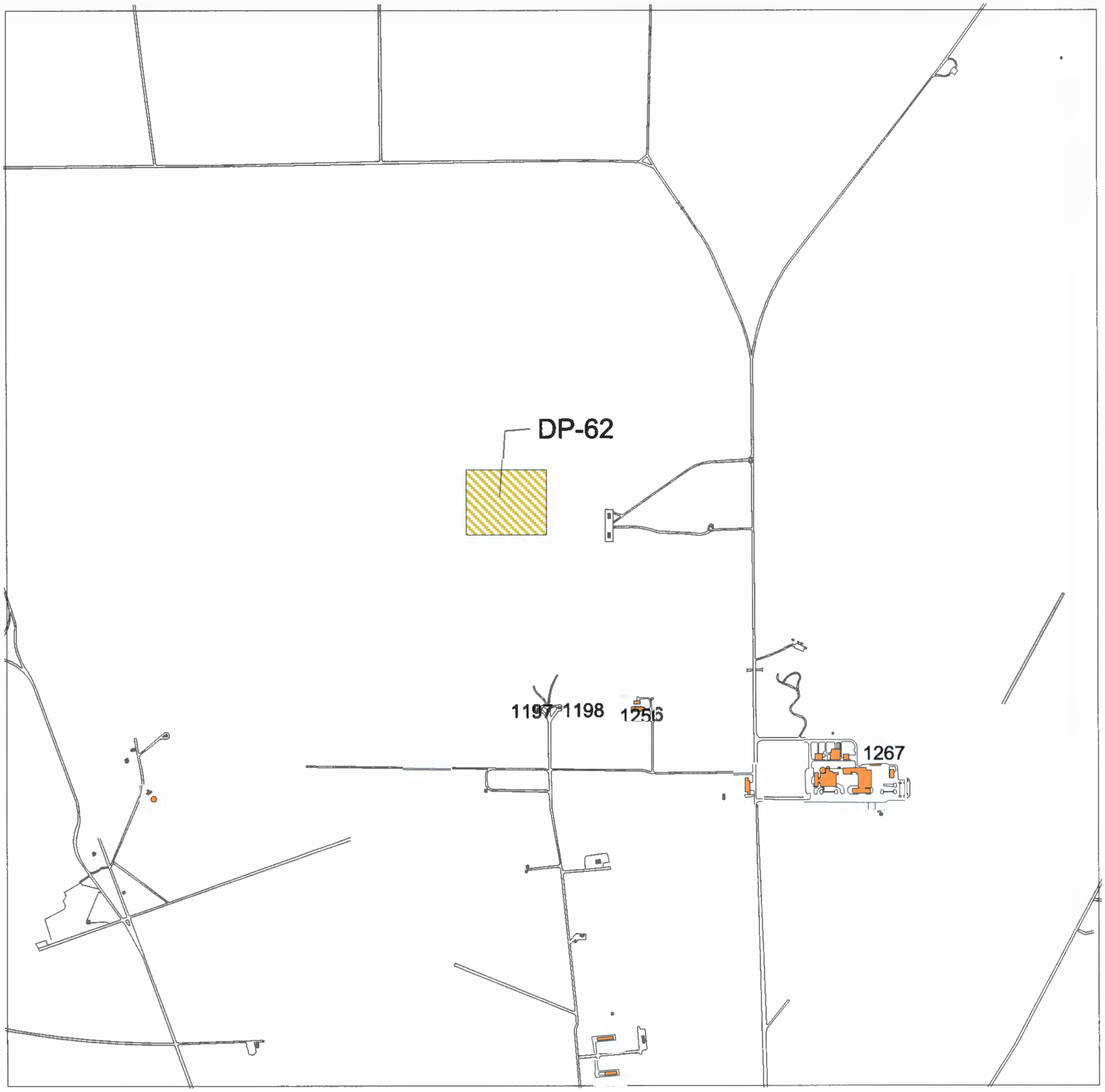
Figure C3-59

Holloman Air Force Base
New Mexico

SS-60, BLDG. 828 FUEL SPILL SITE

Figure C3-60

Holloman Air Force Base New Mexico	SS-61, FUEL SPILL	Figure C3-61



Railroad

Fence

Storm Drain

Drainage Channel

Stream

Water

Building

ERP Site

Area of Concern

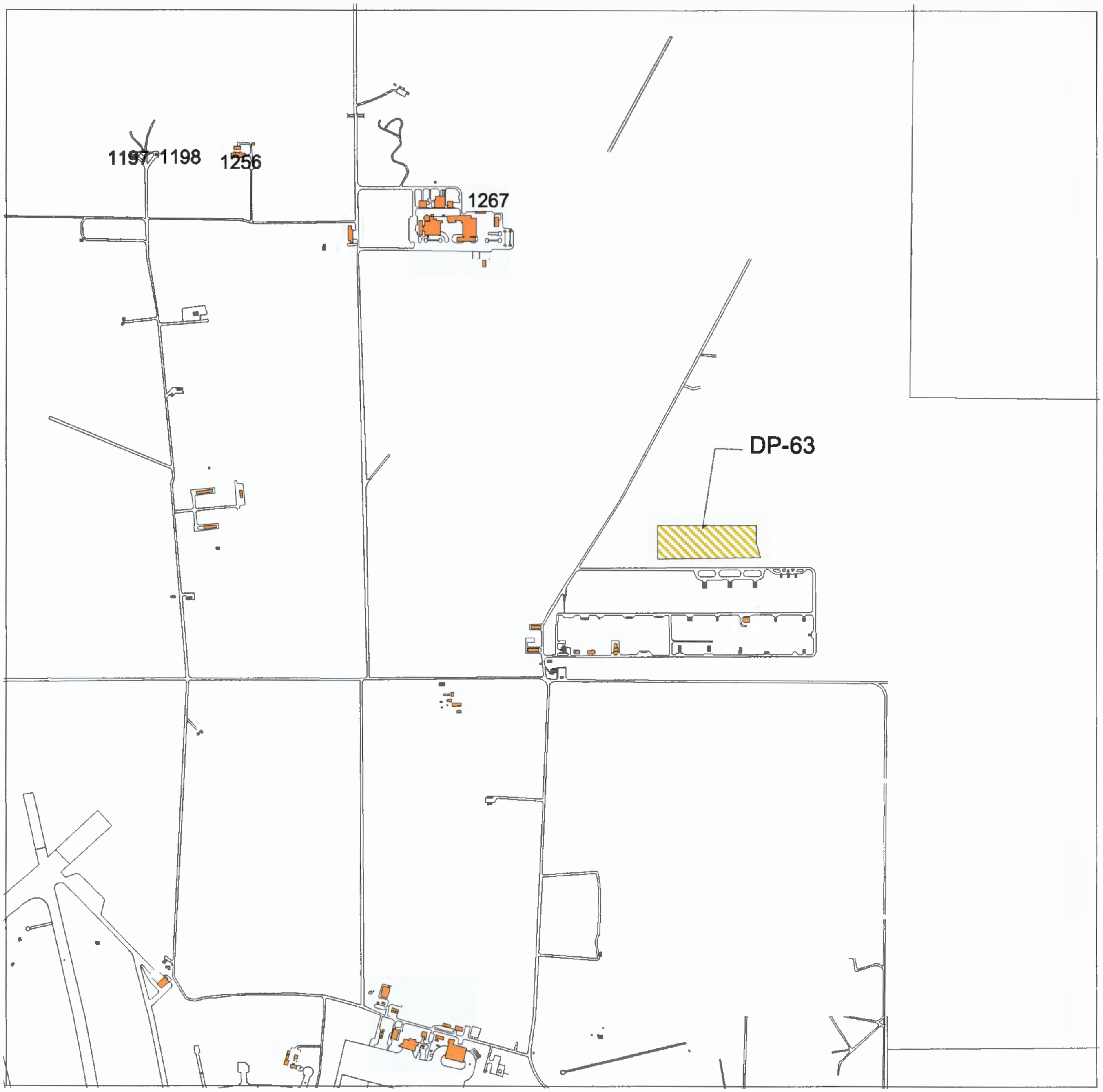
Area of Contamination

N

0 2500 5000

Feet

Holloman Air Force Base New Mexico	DP-62, DISPOSAL PIT	Figure C3-62



Railroad
Fence
Storm Drain
Drainage Channel
Stream
Water
Building
ERP Site
Area of Concern
Area of Contamination

N
0 2500 5000
Feet

Holloman Air Force Base New Mexico	DP-63, MUNITIONS DISPOSAL PIT	Figure C3-63

Holloman Air Force Base New Mexico	DP-64, CHEMICAL AGENT SITE	Figure C3-64

APPENDIX D1

FUTURE LAND USE OPTIONS AND OFF-BASE PROPERTIES

TABLE OF CONTENTS

LIST OF FIGURES

D1-1. FUTURE LAND USE OPTIONS

The Base has developed a future land use plan and a long-range facilities development plan. Physical constraints, restrictions imposed by airfield or explosive safety criteria, and compatibility with the development of communities surrounding the Base are considered during base comprehensive planning. The range of reasonable future uses for a specific site was determined by surrounding land uses and projections for likely development in the area of the site, and is consistent with the BCP. Each potential future land use option was evaluated to provide a thorough framework to allow decisions to be made by the Air Force, regulators, and the community, thereby creating uniform expectations for the future use of each site and for corresponding cleanup levels that will provide a safe environment for future inhabitants of the property. Table D1-1 summarizes the likely future use of each site at Holloman AFB. Figures D1-1 through D1-3 indicate the environmental condition of the main base area and off-Base property, and Figure D1-4 indicates future land use. Table D1-3 lists property records for Holloman AFB.

Under the RNSI approach, other than residential, sites that are remediated to meet designated land use criteria will be deed restricted, or another similar mechanism will be used to ensure that the land use does not change without prior evaluation of land use criteria. This will assure that the actual future use of the property is limited to the future land use previously agreed upon by the Air Force, the regulatory agencies, and community planners. If the land use should be reassigned, then the land use criteria would be reopened and reviewed by the Base and regulatory agencies at that time.

There are a limited number of land uses that need to be considered at any given AFB. Under the RNSI approach, anticipated future land uses of sites have been categorized as residential, open space, commercial, and industrial. Restrictions on land and natural resources for each of these categories were adapted from *Future Use Considerations in the Cleanup of Air Force Installations* (USAF 1992). A description of each of the four land use categories is presented below.

D1-1.1 RESIDENTIAL LAND USE

Residential land use is assumed when there are or may be occupied residences on or immediately adjacent to the site. The residential category includes family housing for permanent party or transient personnel and associated support facilities, as well as all other forms of lodging for unmarried or unaccompanied personnel. Potentially significant exposure pathways for residential land use include: 1) ingestion, inhalation, and dermal contact with groundwater; 2) ingestion and dermal contact with soil; 3) inhalation of ambient air; 4) ingestion and dermal contact with surface water; and 5) ingestion, inhalation, and dermal contact with soils during intrusive actions.

D1-1.2 OPEN SPACE LAND USE

The open space category includes undeveloped lands that are barren or where the naturally occurring vegetation includes grasses, shrubs, or trees that are to be retained as buffer zone easements or clear zones. It also includes those areas to be retained for conservation or grazing purposes and outdoor sports fields and courts. Potentially significant exposure pathways for open space land use include: 1) ingestion and dermal contact with soil; 2) inhalation of ambient air; and 3) ingestion and dermal contact with water.

D1-1.3 COMMERCIAL LAND USE

Commercial land use includes any structure of a commercial or institutional nature to which the general public, including children, the elderly, and other potentially sensitive populations, may have access. This category includes all office functions not directly associated with the flying mission, those facilities which provide for the sale of goods and services, those facilities which support morale and welfare, and physical and mental health facilities. Potentially significant exposure pathways for commercial land use include: 1) ingestion of and dermal contact with soil; 2) inhalation of ambient air; and 3) ingestion, inhalation, and dermal contact with soils during intrusive actions.

D1-1.4 INDUSTRIAL LAND USE

Industrial land use options include areas of developed land used for manufacturing or industrial purposes. This category includes pavements and facilities which directly support the flying mission, those facilities required to operate and maintain aircraft in support of the flying mission, and maintenance and storage functions not directly related to the flying mission. Potentially significant exposure pathways for industrial land use include: 1) dermal contact or inhalation of constituents that volatilize from groundwater and surface water; 2) ingestion and dermal contact with soil; 3) inhalation of ambient air; and 4) ingestion, inhalation, and dermal contact with soils disturbed during intrusive actions.

TABLE D1-1 FUTURE LAND USE RISK ASSESSMENT FOR DEVELOPING REMEDY SELECTIONS

Management Action Plan
Holloman AFB, New Mexico

WIMS-ES NUMBER	SITE NAME	CONTAMINANTS			CURRENT USE	ADJACENT USE	FUTURE USE (Anticipated)
		Groundwater	Soil	Surface/Sediment			
LF-01	Existing Main Base Landfill	VOCs, SVOCs, and Metals	Not sampled	Not sampled	Open Space	Industrial	Industrial
SS-02	POL Spill Site Number 1	BTEX	BTEX and TRPH	Not sampled	Industrial	Industrial	Industrial
OT-03	POL Tank Sludge Burial Area	VOCs and metals	Beryllium and lead	Not sampled	Industrial	Industrial	Industrial
OT-04	Acid Trailer Burial Site	Metals	None	Not sampled	Open space	Open space	Open space
SS-05	POL spill Site Number 2	BTEX	BTEX and TRPH	Not sampled	Industrial	Industrial	Industrial
SS-06	Fuel Line Spill Number 2	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial
LF-07	Rubble Disposal Site	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial
SD-08	Refuse Collection Truck Washrack	VOCs, pesticides, and metals	Pesticides and metals	Not sampled	Industrial	Industrial	Industrial
SS-09	Waste POL Drum Storage/ Spill	VOCs and metals	Metals	Not sampled	Industrial	Industrial	Industrial
LF-10	Old Main Base Landfill	VOCs and pesticides	VOCs	Not sampled	Industrial	Residential/ Industrial	Industrial
OT-11	Main Base Electrical Substation	Not sampled	PCBs, TRPH	PCBs, TRPH	Industrial	Residential/ Industrial	Industrial
SS-12	Fuel Line Spill Number 1	BTEX	TRPH, BTEX	None	Industrial	Residential/ Industrial	Industrial
SS-13	Sodium Arsenite Spill Site	Arsenic	Arsenic	Not sampled	Industrial	Residential/ Industrial	Industrial

TABLE D1-1 (CONTINUED)

FUTURE LAND USE RISK ASSESSMENT FOR DEVELOPING REMEDY SELECTIONS

WIMS-ES NUMBER	SITE NAME	CONTAMINANTS			CURRENT USE	ADJACENT USE	FUTURE USE (Anticipated)
		Groundwater	Soil	Surface/Sediment			
OT-14	Former Entomology Shop	None	Pesticides	Not sampled	Industrial	Residential/ Industrial	Industrial
SD-15	Refrigeration/Heat Shop Washrack	Not sampled	Not sampled	Not sampled	Industrial	Residential/ Industrial	Industrial
OT-16	Existing Entomology Shop	VOCs and pesticides	VOCs, pesticides, PCBs, TRPH	Not sampled	Industrial	Commercial/ Open Space	Commercial/ Open Space
SS-17	BX Service Station Fuel Leak Area	VOCs, and SVOCs	VOCs, and SVOCs	Not sampled	Commercial	Commercial/ Residential	Commercial
SS-18	Chromic Acid Spill Site	Chromium	None	Not sampled	Industrial	Industrial	Industrial
LF-19	Golf Course Landfill	Metals	Not sampled	Not sampled	Open space	Open space	Open space
OT-20	Wastewater Treatment Plant Grit Burial Site	Not sampled	Metals, PCBs, and Pesticides	Not sampled	Industrial	Industrial	Industrial
LF-21	West Area Landfill Number 2	VOCs and metals	Not sampled	Not sampled	Industrial	Industrial	Industrial
LF-22	West Area Landfill Number 1	Metals	Not sampled	Not sampled	Industrial	Industrial	Industrial
LF-23	MOBSS Landfill	Metals	Not sampled	Not sampled	Industrial	Industrial	Industrial
OT-24	Former Equipment Maintenance Area	VOCs	Not sampled	Not sampled	Industrial	Industrial	Industrial
SD-25	Drainage Lagoon Disposal Site	Not sampled	VOCs and TRPH	VOCs and TRPH	Industrial	Industrial	Industrial
SS-26	Possible Missile Fuel Spill Site	Metals	VOCs and Metals	Not sampled	Industrial	Industrial	Industrial
SD-27	Pad 9 Washrack Area	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial

TABLE D1-1 (CONTINUED)

FUTURE LAND USE RISK ASSESSMENT FOR DEVELOPING REMEDY SELECTIONS

WIMS-ES NUMBER	SITE NAME	CONTAMINANTS			CURRENT USE	ADJACENT USE	FUTURE USE (Anticipated)
		Groundwater	Soil	Surface/Sediment			
SD-28	Former North Area Washrack	None	None	Not sampled	Open space	Open space	Open space
LF-29	Former Army Landfill	VOCs and metals	Not sampled	Not sampled	Open space	Open space	Open space
DP-30	Grease Trap Disposal Pits	Metals	Metals and PCBs	Not sampled	Open space	Industrial/Open space	Open space
FT-31	Fire Department Training Area	TRPH, VOCs, and lead	TRPH, VOCs, and lead	TRPH	Industrial	Open space	Open space
OT-32	Sewer Lines from Primate Research Lab	Not sampled	Low levels of oil and grease	Not sampled	Open space	Open space	Open space
SD-33	Cooking Grease Disposal Pits	Metals	Metals, PCBs, and pesticides	Not sampled	Open space	Industrial/Open space	Open space
OT-34	Spent Munitions Burial Site	Not sampled	Not sampled	Not sampled	Open space	Open space	Open space
OT-35	Spent Solvent Disposal Area	Not sampled	None	Not sampled	Industrial	Commercial	Commercial
SS-36	Unconventional Fuel Spill Site	Metals	Not sampled	Not sampled	Open space	Open space	Open space
OT-37	Early Missile Testing Area	Metals	Metals and PCBs	Not sampled	Open space	Open space	Open space
OT-38	Sled Test Maintenance Area	Metals and VOCs	TRPH	Not sampled	Industrial	Industrial	Industrial
SS-39	Missile Fuel Line Spill Area	VOCs	Metals	Metals	Industrial	Industrial/Open space	Industrial
LF-40	Causeway Rubble Disposal Site	Not sampled	Not sampled	Not sampled	Open space	Open space	Open space

TABLE D1-1 (CONTINUED)

FUTURE LAND USE RISK ASSESSMENT FOR DEVELOPING REMEDY SELECTIONS

WIMS-ES NUMBER	SITE NAME	CONTAMINANTS			CURRENT USE	ADJACENT USE	FUTURE USE (Anticipated)
		Groundwater	Soil	Surface/Sediment			
OT-41	Coco Blockhouse Borehole Disposal Site	None	None	Not sampled	Industrial	Industrial	Industrial
RW-42	Radioactive Material Burial Site	Not sampled	Not sampled	Not sampled	Open space	Open space	Open space
DP-43	Atlas Electrical Substations	Not sampled	TPH and PCBs	TPH and PCBs	Open space	Open space	Open space
OT-44	Building 301, Aircraft Maintenance Hangar	VOCs	VOCs, TRPH	Not sampled	Industrial	Industrial	Industrial
OT-45	Old AGE Refueling Station	VOCs and lead	VOCs, TRPH	Not sampled	Industrial	Industrial	Industrial
SS-46	JP-4 Spill Site	None	Low levels of VOCs	Not sampled	Industrial	Industrial	Industrial
SD-47	POL Washrack Discharge Area	VOCs, SVOCs, and TRPH	SVOCs and TRPH	Not sampled	Industrial	Industrial	Industrial
SS-48	Military Gas Station	VOCs, SVOCs, and TRPH	VOCs and TRPH	Not sampled	Industrial	Industrial	Industrial
WP-49	Sewage Lagoons	Pesticides and metals	None	Pesticides and metals	Industrial	Industrial	Industrial
WP-50	Waste Disposal Pit	Not sampled	Mercury and TRPH	None	Open space	Open space	Open space
RW-51	Primate Research Lab Borehole Disposal Site	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial
OT-52	Boles and Sand Andres Wellfield Area	Not sampled	Not sampled	Not sampled	Commercial	Commercial	Commercial
OT-53	Bonito Lake	Not sampled	Not sampled	Not sampled	Commercial	Commercial	Commercial
OT-54	Silver City Radar Site	Not sampled	Not sampled	Not sampled	Commercial	Commercial	Commercial
OT-55	El Paso Radar Site	Not sampled	Not sampled	Not sampled	Commercial	Commercial	Commercial

TABLE D1-1 (CONTINUED)

FUTURE LAND USE RISK ASSESSMENT FOR DEVELOPING REMEDY SELECTIONS

WIMS-ES NUMBER	SITE NAME	CONTAMINANTS			CURRENT USE	ADJACENT USE	FUTURE USE (Anticipated)
		Groundwater	Soil	Surface/Sediment			
SS-56	West Ramp Fuel Spill	TRPH	TRPH	Not sampled	Industrial	Industrial	Industrial
SS-57	Officer's Club	VOCs and SVOCs	TRPH and diesel	Not sampled	Commercial	Commercial	Commercial
LF-58	Incinerator Landfill	Not sampled	Aniline, metals	Aniline, metals	Open space	Open space	Open space
SS-59	T-38 Test Cell Fuel Spill Site	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial
SS-60	Bldg. 828 Fuel Spill Site	BTEX	Not sampled	Not sampled	Industrial	Industrial	Industrial
SS-61	Fuel Spill	Benzene and 1,2-DCA	Benzene and 1,2-DCA	Not sampled	Industrial	Industrial	Industrial
DP-62	Ritas Draw	Metals	Metals	Not sampled	Industrial	Industrial	Industrial
DP-63	Munitions Yard	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial
DP-64	Chem Agent Site	Not sampled	Not sampled	Not sampled	Industrial	Industrial	Industrial

Notes:

AFB = Air Force Base
ERP = Environmental Resources Program
SVOCs = Semivolatile Organic Compounds
TRPH = Total Recoverable Petroleum Hydrocarbons
BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
PCBs = Polychlorinated Biphenyls
TPH = Total Petroleum Hydrocarbons
VOCs = Volatile Organic Compounds

D1-1.5 OFF-BASE PROPERTY

Several off-Base properties are, or have been, operated by the Base. Table D1-2 and Figure 1-4 present information regarding the off-Base properties.

TABLE D1-2 OFF-BASE PROPERTIES FOR HOLLOMAN AFB

Management Action Plan

Holloman AFB, New Mexico

Name	Acres	Location*	Date Acquired	Dates of Operation	Number of Restoration Sites
Boles and San Andres Wellfield Area	2128 Acre Fee Purchase 5207 Acre Easement	14 miles southwest	1949 Lease 1957 Fee purchase	1949-Present	1
Bonito Lake	77 Acre Perpetual Easement 78 Acre General use license and permit	40 miles northwest	1957	1957-Present	1
El Paso Radar Site	1 Acre	80 miles south	1942	1942-1986	1
Silver City Radar Site	1 Acre	160 miles west	1942	1942-1986	1

Notes:
*Location from Holloman AFB

TABLE D1-3 REAL PROPERTY RECORDS FOR HOLLOMAN AFB

(Past and Current Properties Operated or Used by Holloman AFB)

Management Action Plan

Holloman AFB, New Mexico

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Bureau of Land Management	35,235.74	8 miles west of Alamogordo			
Thomas Alonzo Danley	240	8 miles west of Alamogordo			
Thomas Alonzo Danley	160	8 miles west of Alamogordo			
State of New Mexico	602.32	8 miles west of Alamogordo	21 Oct. 1981	1981-present	Court of Claims Case No. 94-79L, opinion 21 Oct. 1981
State of New Mexico	588.16	8 miles west of Alamogordo	21 Oct. 1981	1981-present	Court of Claims Case No. 94-79L, opinion 21 Oct. 1981
State of New Mexico	640	8 miles west of Alamogordo	21 Oct. 1981	1981-present	Court of Claims Case No. 94-79L, opinion 21 Oct. 1981
State of New Mexico	640	8 miles west of Alamogordo 67 miles NW of Las Cruces	21 Oct. 1981	1981-present	Court of Claims Case No. 94-79L, opinion 21 Oct. 1981
State of New Mexico	640	8 miles west of Alamogordo 67 miles NW of Las Cruces	21 Oct. 1981	1981-present	Court of Claims Case No. 94-79L, opinion 21 Oct. 1981
Jean Davis AKA Wanda Jean Davis	80	8 miles west of Alamogordo 67 miles NW of Las Cruces	13 Feb. 1985	1981-present	Quitclaim Deed, dated 13 Feb. 1985
W.H. Goodwin, ET UX	640	8 miles west of Alamogordo 67 miles NW of Las Cruces	5 Feb. 1943	1981-present	Warranty Deed, dated 5 Feb. 1943

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Ann I. Walters, ET AL.	40	8 miles west of Alamogordo 67 miles NW of Las Cruces			
Glen Richards, ET AL. (Trustee)	720	8 miles west of Alamogordo	12 Jan. 1981	1981-present	Quitclaim Deed, dated 12 Jan. 1981
Joan Pilcher	80	8 miles west of Alamogordo	24 Feb. 1981	1981-present	Quitclaim Deed, dated 24 Feb. 1981
Department of the Interior	4482.80	8 miles SW of Alamogordo	29 Jan. 1942	1942-present	Formerly known as tracts A-2 and B-4. PLO 7 dtd 29 Jan. 1942
Department of the Interior	160	8 miles SW of Alamogordo	27 Sept. 1943	1943-present	Formerly known as tract No. A-5. PLO 173 dtd 27 Sept. 1943
Department of the Interior	972.07	8 miles SW of Alamogordo	4 Oct. 1944 20 April 1953	1944-present	Permit for site for Obstruction Light, Dated 4 Oct. 1944 Special Land Use Permit, Dated 20 April 1953
Department of the Interior	No Area	8 miles SW of Alamogordo	6 Nov. 1943	1943-present	Special Use Permit, dated 6 Nov. 1943
Department of the Interior	156.38	8 miles SW of Alamogordo	23 Feb. 1982	1982-present	R/W NM 45808 23 Feb. 1982
Department of the Interior	1280.20	8 miles SW of Alamogordo	21 May 1952	1952-present	Former Leased Tr. No. 13, part of Former Leased Tr. No. 14 merged by Purchase of Grazing Rights Public Land Order No. 833, Dated 21 May 1952

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Department of the Interior	No Area	8 miles SW of Alamogordo	15 Feb. 1950	1950-present	Special Land Use, Dated 15 Feb. 1950 for Twin Buttes Instrumentation Site. Amended 3 April 1953 to include Utilization of same Site for Obstruction Lights of Holloman AFB
Department of the Interior	95.13 651.56	8 miles SW of Alamogordo	1 June 1955	1955-present	Public Land Order No. 1157, Dated 1 June 1955
Department of the Interior	17.31	8 miles SW of Alamogordo	1 June 1958	1958-present	Notation on Public Land Records, dated 1 July 1958.
Department of the Army	No Area	8 miles SW of Alamogordo	13 Feb.1959	1959-present	3rd Ind. W.S.M.R. to D.E.A.D., dated 13 Feb. 1959
Department of the Interior	100	8 miles SW of Alamogordo	17 May 1960	1960-present	Public Land Order No. 2091, dated 17 May 1960
State of New Mexico, ET AL.	642.28	8 miles SW of Alamogordo			Civil Action No. 1707.
State of New Mexico, ET AL.	632.91	8 miles SW of Alamogordo			Civil Action No. 1707.
State of New Mexico	640	8 miles SW of Alamogordo	14 Dec. 1948	1948-present	Lease No. W-29-005-eng-633, dated 14 Dec. 1948. Merged in Fee.
State of New Mexico	30.55	8 miles SW of Alamogordo			Addition of 0.22 Ac revested in State of N. Mex. 30 June 1959 Includes 0.43 acres of Tract No. 30E

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Robert N. Woodworth, ET UX	10.07	8 miles SW of Alamogordo			
C.A. McNatt, ET UX	10.08	8 miles SW of Alamogordo	12 May 1954	1954-present	Warranty Deed, dated 12 May 1954
Harvey Investment Company	30.23	8 miles SW of Alamogordo	25 Feb. 1954	1954-present	Warranty Deed, dated 25 Feb. 1954
John R. Knibb, ET AL.	10.09	8 miles SW of Alamogordo	12 July 1955	1955-present	Warranty Deed, dated 12 July 1955
Harvey Investment Company	5.04	8 miles SW of Alamogordo	25 Feb. 1954	1954-present	Warranty Deed, dated 25 Feb. 1954
State of New Mexico	10.08	8 miles SW of Alamogordo	28 June 1955	1955-present	Final Judgement, dated 28 June 1955 C.A. No. 2676
Harvey Investment Company	15.13	8 miles SW of Alamogordo	25 Feb. 1954	1954-present	Warranty Deed, dated 25 Feb. 1954
Leon Green, ET UX	23.36	8 miles SW of Alamogordo	23 Sept. 1954	1954-present	Warranty Deed, dated 23 Sept. 1954
State of New Mexico	78.79	8 miles SW of Alamogordo			
Wesley Walker, ET AL.	6.89	8 miles SW of Alamogordo			
Wesley Walker, ET AL.	3.13	8 miles SW of Alamogordo			
Wesley Walker, ET AL.	.94	8 miles SW of Alamogordo			
Wesley Walker, ET AL.	2.19	8 miles SW of Alamogordo			

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Wesley Walker, ET AL.	6.72	8 miles SW of Alamogordo			
Department of the Interior	.44	8 miles SW of Alamogordo			
State of New Mexico	9.35	8 miles SW of Alamogordo			
Department of the Interior	14.05	8 miles SW of Alamogordo			
State of New Mexico	3.51	8 miles SW of Alamogordo			
State of New Mexico	2	8 miles SW of Alamogordo			
Bureau of Land Management	10.71	8 miles SW of Alamogordo, 67 miles NW of Las Cruces	14 April 1969	1969-present	PLO 4627 dtd 14 April 1969
Bureau of Land Management	.57	8 miles SW of Alamogordo, 67 miles NW of Las Cruces	14 April 1969	1969-present	PLO 4627 dtd 14 April 1969
Bureau of Land Management	1.52	8 miles SW of Alamogordo, 67 miles NW of Las Cruces	14 April 1969	1969-present	PLO 4627 dtd 14 April 1969
Bureau of Land Management	5.57	8 miles SW of Alamogordo 67 miles NW of Las Cruces	14 April 1969	1969-present	PLO 4627 dtd 14 April 1969

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
National Park Service	6.89	8 miles SW of Alamogordo 67 miles NW of Las Cruces			
State of New Mexico	9.03	8 miles SW of Alamogordo, 67 miles NW of Las Cruces			
Maude Fairchild	3.34	8 miles SW of Alamogordo, 67 miles NW of Las Cruces			
Department of the Interior	440	8 miles SW of Alamogordo	30 July 1948	1948-present	Formerly known as Trs. 4 & 4-1 PLO 509 dtd 30 July 1948, PLO 3695 revoked 400 acres
Department of the Interior	6.55	8 miles SW of Alamogordo	15 June 1950	1950-present	Formerly known as Trs. 17 & 17-1. Use Permit, dated 15 June 1950
Luther C. Boles, ET UX	239	8 miles SW of Alamogordo	29 July 1947	1947-present	Perpetual Easement for water well from 29 July 1947 (159 acres) merged in Fee. Deleted Tr No 42 N 1/2 NE 1/4 Sec. 25, 1.17S, R.9E (80 acres) acquired in Fees

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Gertrude Walker	640	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action Nos. 1261 & 2386. Merged in Fee.
Anna Prewitt Wright, ET VIR	120	8 miles SW of Alamogordo	1 June 1953	1953-present	Lease No. DA-29-005-eng 1082, Dtd 1 June 1953, Merged in fee.
Villa R. Daggett	160	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action Nos. 1261 & 2386. Merged in fee.
Harold Striker, Estate	160	8 miles SW of Alamogordo	28 August 1947	1947-present	Lease No. W-41-038-eng-6812, Dated 28 Aug. 1947. Merged in fee.
R.N. Nolley, ET UX	130	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action Nos. 1261 & 2386. Merged in fee.
L.L. Pate, ET UX	30	8 miles SW of Alamogordo	25 August 1947	1947-present	Lease No. W-41-038-eng-6811, Dated 25 Aug. 1947. Merged in fee.
W.E. Groom, ET AL.	160	8 miles SW of Alamogordo	2 Sept. 1947	1947-present	Lease No. W-41-038-eng-6809, Dated 2 Sept. 1947. Merged in fee.
Mary S. Lutz	160	8 miles SW of Alamogordo	28 August 1947	1947-present	Lease No. W-41-038-eng-6810, Dated 28 Aug. 1947. Merged in fee.
Mrs. Mattie Mae Spellings, ET AL.	140.32	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action 2386. Merged in fee.

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

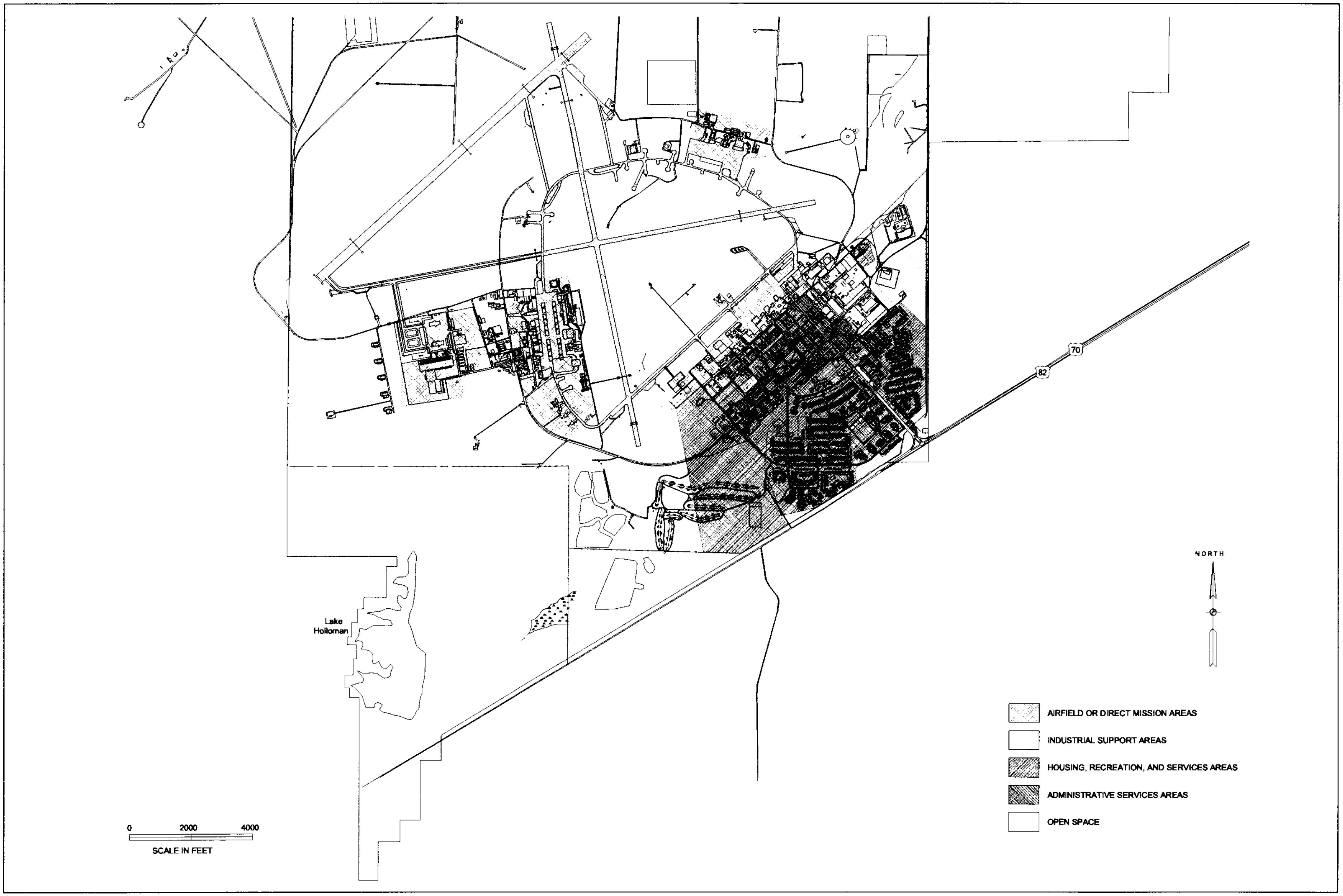
Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Pearl Frasier Harrington, ET AL.	320	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action 2386. Merged in fee.
George A. Shipley, ET UX	80	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action 2386. Merged in fee.
Joan Virginia Leonard Gallagher	160	8 miles SW of Alamogordo	10 Nov. 1953	1953-present	Originally acquired by lease through Civil Action 2386 and lease No. DA-29-005-eng-1168, Dated 10 Nov. 1953. Merged in fee.
Maggie Goldena Helm, ET VIR	20	8 miles SW of Alamogordo	1 May 1953	1953-present	Leasee No. DA-29-005-eng-1022, Dated 1 May 1953. Merged in fee.
Troy Leslie Blair, ET UX	20	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action 2386. Merged in fee.
L.L. Pate, ET UX	20	8 miles SW of Alamogordo	11 Jan. 1959	1959-present	Originally acquired by lease through Civil Action 2386 and a delayed lease No. DA-29-005-eng-2214, Dated 11 Jan. 1959. Merged in fee.
Otis Lee Blair, ET UX	19.5	8 miles SW of Alamogordo	9 Mar. 1954	1954-present	Originally acquired by lease through Civil Action 2386 and Lease No. DA-29-005-eng-1229, Dated 9 Mar. 1954. Merged in fee.

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
G.W. Orvig, ET UX	36.23	8 miles SW of Alamogordo	16 Feb. 1953	1953-present	Lease No. DA-29-005-eng-1000, Dated 16 Feb. 1953. Merged in fee.
Leah Henry	32.28	8 miles SW of Alamogordo	10 April 1953	1953-present	Lease No. DA-29-005-eng-1008, Dated 10 April 1953. Merged in fee.
W.L. McCommon	30.16	8 miles SW of Alamogordo			Originally acquired by lease through Civil Action 2386. Merged in fee.
L.H. Fitzgerald, ET AL.	70.16	8 miles SW of Alamogordo	2 April 1953	1953-present	Lease No. DA-29-005-eng-1006, Dated 2 April 1953. Merged in fee. Includes 2.33 acres of Tract No. 23 and entire acreage (0.98) of Tract No. 23-1
School District No. 1 Otero County, N.M.	1	8 miles SW of Alamogordo			Formerly Tract No. 70
Dare Memorial Rest Home Foundation, Inc.	526	8 miles SW of Alamogordo	22 Dec. 1960.	1960-present	Reversionary Easement dated 22 Dec. 1960. Merged in fee.
Department of the Interior	40	8 miles SW of Alamogordo			
Department of the Interior	40	8 miles SW of Alamogordo			
Marvin C. Green	15	8 miles SW of Alamogordo			
E.T. Moya	15	8 miles SW of Alamogordo			
Ralph M. Lermayer	10	8 miles SW of Alamogordo			

TABLE D1-3 (CONTINUED)
REAL PROPERTY RECORDS FOR HOLLOMAN AFB
(PAST AND CURRENT PROPERTIES OPERATED OR USED BY HOLLOMAN AFB)

Name	Acres	Location	Date Acquired/ Leased	Date of Operation	Comments
Shamaley & Lyon Walker	1.25	8 miles SW of Alamogordo			
Shamaley & Lyon Walker	2.5	8 miles SW of Alamogordo			
Shamaley & Lyon Walker	1.25	8 miles SW of Alamogordo			
City of Alamogordo	1.23	8 miles SW of Alamogordo			
Kenneth E. & Sara Calkins	1.06	8 miles SW of Alamogordo			
Wesley L. & Sall Walker	.19	8 miles SW of Alamogordo			
State of New Mexico	2.79	8 miles SW of Alamogordo			
Clifton G. & Barbara A. McDonald	1.25	8 miles SW of Alamogordo			
Bureau of Land Management	.88	8 miles SW of Alamogordo			
Bureau of Land Management	.68	8 miles SW of Alamogordo			
Bureau of Land Management	.17	8 miles SW of Alamogordo			
Bureau of Land Management	1.25	8 miles SW of Alamogordo			
Bureau of Land Management	Approx. 1,000	Adjacent to, and west of current sewage lagoons			



Holloman Air Force Base New Mexico	FUTURE LAND USE	Figure D1-1

APPENDIX D2

RESTORATION-RELATED COMPLIANCE PROGRAM

TABLE OF CONTENTS

D2 RESTORATION-RELATED COMPLIANCE PROGRAM STATUS

Compliance activities at Holloman AFB are being conducted concurrently with environmental restoration activities under the ERP. Compliance activities address the RCRA corrective action program, underground storage tanks (USTs), hazardous materials management, and polychlorinated biphenyls (PCBs). Table D2-1 summarizes the status of compliance activities.

D2.1 UNDERGROUND STORAGE TANK SITES

There is currently one UST remaining at the Base regulated under EPA and New Mexico; the others were removed or abandoned-in-place in fiscal year (FY) 1996 under a MILCON project. Several oil/water separators and waste oil tanks were removed as part of the RCRA Correction Action Program Petroleum, Oil, Lubricants (POL) Remediation project. These activities were conducted under the RCRA Subpart I and the New Mexico UST Program.

D2.2 SOLID WASTE, PCBS AND OTHER COMPLIANCE PROGRAMS

The largest of the compliance programs is the RCRA corrective action program, which requires investigation of 114 SWMUs and Areas of Concern (AOCs) listed in the Base's HSWA permit. The SWMUs and AOCs in the HSWA permit are divided into three tables (Tables 1, 2, and 3) on the basis of their risk to human health and the environment (Table 1 is highest potential for risk and Table 3 the lowest) each of which have separate compliance schedules. Table 1 includes 32 SWMUs and 6 AOCs; Table 2 sites include 30 SWMUs and 1 AOC; and Table 3 includes 44 SWMUs and 1 AOC.

Thirty-seven of Table 1 SWMUs/AOCs are also ERP sites, 10 of Table 2 are ERP sites, and 8 of Table 3 are ERP sites. A total of 55 of the SWMUs/ AOCs are also ERP sites. The sewage lagoons are a hazardous waste management unit (HWMU).

The attached Table D2-2 lists the SWMUs and AOCs at Holloman AFB; HSWA SWMU information is summarized in Table D2-3. Site plans in Appendix C3 show the locations of the SWMUs.

The status of the SWMUs is as follows:

- Two SWMUs are in the RFI/corrective measures study (CMS) stage.
- Twelve SWMUs are classified as undergoing voluntary corrective action (VCA).
- One SWMU is in the corrective measures implementation (CMI) phase.
- 18 SWMUs are classified as having permit modification in 1993.
- 83 additional SWMUs have undergone permit modification and are awaiting State signature.
- Sewage lagoons (WP-49), a RCRA HWMU, closed in accordance with provisions of the FFCA and RCRA 40 CFR Part 265 requirements. (Site is closed under the ERP; groundwater monitoring continues under basewide GW monitoring.)

- Main Base landfill, an inactive Subtitle D Municipal Solid Waste RCRA site, is closed with LTM. A closure plan was submitted to New Mexico Environment Department (NMED) Solid Waste Bureau in September 1999, and is awaiting State signature.

Other compliance activities at the Base include the following:

- Hazardous materials management at the Defense Reutilization and Marketing Office (DRMO)-permitted unit under RCRA Subtitle C in accordance with RCRA regulations.

- PCB disposal in accordance with the Toxic Substances Control Act (TSCA), as amended, and U.S. Environmental Protection Agency (EPA) PCB policy. There is no PCB equipment remaining at Holloman AFB.

TABLE D2-1 HOLLOMAN AFB COMPLIANCE PROGRAM STATUS

Management Action Plan
Holloman AFB, New Mexico

Project	Status	Regulatory Program
RCRA Corrective Action Program	SWMUs requiring investigation/remediation · Table 1 SWMUs -- RFI completed · Table 2 SWMUs -- RFI completed · Table 3 SWMUs -- RFI completed	Corrective Action Program
Underground Storage Tanks	· USTs in use: 1 · Flightline (pumphouse) USTs: 0 · USTs pickled: 0 · USTs removed or abandoned in place: 42 -- Satisfactory: 42	New Mexico UST Program and RCRA Subpart I
Hazardous materials/waste management	Hazardous wastes are collected at 43 satellite and two 90-day accumulation points, transported to the TSD facility on-base, and disposed of by a licensed contractor	New Mexico Hazardous Waste Management Regulations
Closure of RCRA units	Active RCRA units include: -- Oil/water separators (3) Inactive RCRA units include: -- EOD facility (300lb Open Burn Unit) -- Sewage Lagoons (WP-49) (Inactive as of July 1996, closed with groundwater monitoring) -- Main Base Landfill (LF-01) (closed with LTM)	New Mexico RCRA Program
PCB storage inspection/ Removal	All transformers at Holloman AFB known to contain PCBs have been removed.	TSCA regulations, EPA policy

Notes:
AFB = Air Force Base
EOD = Explosive Ordnance Division
EPA = U.S. Environmental Protection Agency
FY = Fiscal Year
PCB = Polychlorinated Biphenyls
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation
SWMU = Solid Waste Management Unit
TSCA = Toxic Substances Control Act
TSD = Treatment, Storage, and Disposal
UST = Underground Storage Tank

TABLE D2-2 SWMUs, RCRA AOCs, AND PRI AOCs AT HOLLOMAN AFB

Management Action Plan
Holloman AFB, New Mexico

SWMU	Name and Location (where applicable)
SWMU 106	Existing Main Base Landfill
SWMU 114	POL Tank Sludge Burial Site
SWMU 102	Acid Trailer Burial Site
SWMU 110	Rubble Disposal Site
SWMU 82	Refuse Collection Truck Washrack
SWMU 42	Waste POL Drum Storage/ Spill Area
SWMU 101, SWMU 109	Old Main Base Landfill
SWMU 107	Main Base Electrical Substation
SWMU 197	Former Entomology Shop
SWMU 80	Refrigeration/Heat Shop Washrack
AOC-A, SWMU 118, SWMU 132	Existing Entomology Shop
SWMU 105	Golf Course Landfill
SWMU 113A	Wastewater Treatment Plant Grit Burial Site
SWMU 116	West Area Landfill Number 2
SWMU 115	West Area Landfill Number 1
SWMU 108	MOBSS Landfill
SWMU 134	Former Equipment Maintenance Area
SWMU 166	Possible Drainage Lagoon Disposal Site
SWMU 141	Pad 9 Washrack Area
SWMU 212	Former North Area Washrack
SWMU 104	Former Army Landfill
SWMU 113B	Grease Trap Disposal Pits
SWMU 39 SWMU 127, SWMU 135, SWMU 170, SWMU 171	Fire Department Training Area
SWMU PRI-A	Sewer Lines from Primate Research Lab
SWMU 113B	Cooking Grease Disposal Pits
NA	Spent Munitions Burial Site
SWMU PRI-5	Spent Solvent Disposal Area
SWMU 129, SWMU 178	Unconventional Fuel Spill Site
SWMU 137, SWMU 138	Sled Test Maintenance Area
SWMU 165, SWMU 177, SWMU 179, SWMU 181	Missile Fuel Spill Area
SWMU 103	Causeway Rubble Disposal Site
SWMU 192	Coco Blockhouse Borehole Disposal Site

TABLE D2-2 (Continued)

SWMUs, RCRA AOCs, AND PRI AOCs AT HOLLOMAN AFB

SWMU	Name and Location (where applicable)
SWMU 111	Radioactive Material Burial Site
SWMU 21, SWMU 22	POL Washrack Discharge Area
SWMU 139, SWMU 140, SWMU 155, SWMU 156, SWMU 184	Sewage Lagoons
NA	Waste Disposal Pit
SWMU PRI-S	Primate Research Lab Borehole Disposal Site
NA	Boles and San Andres Well Field Area
NA	Bonito Lake
NA	Silver City Radar Site
NA	El Paso Radar Site
NA	West Ramp Fuel Spill Area
NA	Officer's Club
SWMU 231	Incinerator Landfill
SWMU 19, SWMU 20, SWMU 229	T-38 Test Cell Fuel Spill Site
SWMU 230	Bldg. 828 Fuel Spill Site
NA	Fuel Spill
RCRA AOC	**Name and Location (where applicable)**
AOC-T	POL Spill Site Number 1
AOC-T	POL Spill Site Number 2
AOC-R	Fuel Line Spill Site Number 2
AOC-K	Fuel Line Spill Number 1
AOC-J	Sodium Arsenite Spill Site
AOC-A	Existing Entomology Shop
AOC-Q	BX Service Station Fuel Leak Area
AOC-H	Chromic Acid Spill Site
AOC-D	Possible Missile Fuel Spill Site
AOC-L	Early Missile Testing Site
AOC-G	Atlas Electrical Substations
AOC-P	Building 301, Aircraft Maintenance Hanger
AOC-O	Old AGE Refueling Station
AOC-S	JP-4 Spill Site
AOC-N	Military Gas Station
PRI AOC	**Name and Location (where applicable)**
None	

Notes:
"SWMU PRI -_" refers to Primate Research Lab SWMU
AFB = Air Force Base
AOCs = Areas of Concern
FY = Fiscal Year
NPDES = National Pollutant Discharge Elimination System
PRI AOC = Post -RCRA Investigation AOC
RCRA = Resource Conservation and Recovery Act

TABLE D2-3 HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

Management Action Plan
Holloman AFB, New Mexico

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
4	Bldg. 131 O/WS	1		NA	SC	VCA 7/95 (Excavation)	Oil, lubricants, fuel, other vehicle fluids	Pre-1970 to 1980	September 1988
21	Bldg. 702 O/WS	1	21/22/123	NA	SC	VCA 4/96 (Removal & Excavation)	Washwater, waste oil, fuels from adjacent washrack	1980 to 1991	September 1988
42	Waste POL Drum Storage/Spill AQRA	1		SS-09	SC		Waste oils, hydraulic fuels solvents, fuels	1965-1980	September 1988
82	Refuse Collection Washrack	1		SD-08	SC	VCA 10/96 (Asphalt Cap/LTM)	Pesticides	1970s	September 1988
102	Acid Trailer Disposal Site	1		OT-04	SC	VCA 1994 (Debris Removal)	Nitric acid	1958	September 1988
104	Former Army Landfill	1		LF-29	SC	LTM	Munitions and missiles	1950 to 1975	September 1988
105	Golf Course Landfill	1		LF-19	SC	LTM	Grass clippings; rodenticide	1968 to 1978	September 1988
106	Main Base Landfill	1		LF-01	SC	LTM	Construction rubble, debris, domestic solid wastes, small quantities of solvents, waste oils, and pesticides	1958 to 1996	September 1988
107	Main Base Substation PCB Disposal Area	1		OT-11	SC	VCA 8/95 & 5/96 (Excavation)	PCBs	Unknown to 1979	September 1988
108	MOBSS Landfill Disposal Trench	1		LF-23	SC	LTM	Diazinon, dichromochloromethane	1976 to 1979	September 1988
109	Old Main Base Landfill	1	101/109	LF-10	SC	LTM	Domestic wastes, solvents, incinerator ash	1942 to 1958	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
111	Radioactive Waste Disposal Area	1		RW-42	SC		Radioactive material	1950s	September 1988
113A	Sludge Disposal Trenches at Lagoons	1		OT-20	SC		Sludge from grit chamber	1942 to present	September 1988
113B	Sludge Disposal Trenches near Fire Training Area	1		DP-30, SD-33	SC	LTM	Wastes from grease traps	1942 to present	September 1988
114	TEL Disposal Site	1		OT-03	SC	VCA 1994 (Excavation/LTM)	Sludges, rag, iron	1955 to 1975	September 1988
115	West Area Landfill #1 PCB Disposal Area	1		LF-22	SC	LTM	Plastic sheets, boxes, cans	1974 to 1978	September 1988
116	West Area Landfill #2	1		LF-21	SC	LTM	Paper bags, boxes, boards	1970 to 1977	September 1988
122	Bldg. 702 Waste Oil Tank	1		NA	SC	VCA 4/96 (Removal/ Excavation)	Waste JP-4	1953 to present	September 1988
130	Taxiway 4 Tank 28	1		SS-46	SC	LTM	Waste JP-4	1978 to 1990	September 1988
132	Bldg. 21 Leach Field	1	118/132/ AOC-A	OT-16	SC	VCA 2/97 (Excav./LTM)	Rinse water containing water, detergents, pesticide residue	1977 to Present	September 1988
133	Bldg. 703 Washrack Discharge Area	1		SD-47	SC	CMI	Waste JP-4	1953 to present	September 1988
134	Bldgs. 920-924 Drainage Ditch	1		OT-24	SC		Cleaners, waste solvents	1959 to 1970	September 1988
137	Bldg. 1166 Test Track Drainfield	1		OT-38	SC		Waste oils, solvents, paint strippers	1951 to 1979	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
139	Lake Holloman and Ditch from Ponds to Lakes	1	139/140/ 155/156/ 184	WP-49	CMS		Hydraulically connected to sewage lagoons	1943-1996	September 1988
140	Lake Stinky	1	139/140/ 155/156/ 184	WP-49	RFI/ CMS		Hydraulically connected to sewage lagoons		September 1988
165	Bldg. 1176 Pond	1	165/177/ 179/181	SS-39	SC	LTM	Fuels (UDMH, aniline, JP-4, IRFNA, IWFNA, LOX, JPX, dyes, solid rocket propellant, solvents, TCE)	Unknown to Present	September 1988
166	MOBSS Drainage Lagoon	1		SD-25	SC		Pesticides, HTH, solvents	1977	September 1988
170	Fire Department Training Area 1	1	39/127/ 135/170/ 171	FT-31	VCA	RA-O	Oils, solvents, fuels	Unknown to 1990	September 1988
171	Fire Department Training Area 2	1	39/127/ 135/170/ 171	FT-31	SC	RA-O	Oils, solvents, fuels	Unknown to 1990	September 1988
178	Bldg. 1191 Fuel Runoff Pits	1	129/178	SS-36	SC		Fuels (UDMH, aniline, JP-4, IRFNA, IWFNA, LOX, JPX, dyes, solid rocket propellant, solvents, TCE)	1952 to 1964	September 1988
179	Discharge Box	1	165/177/ 179/181	SS-39	SC	LTM	Fuels (UDMH, aniline, JP-4, IRFNA, IWFNA, LOX, JPX, dyes, solid rocket propellant, solvents, TCE)	Unknown to present	September 1988
192	Coco Blockhouse	1		OT-41	SC		Nitric acid	1960s	September 1988
197	Former Entomology Shop	1		OT-14	SC	VCA 11/96 (Asphalt Cap)	Pesticides	1968 to 1977	September 1988
212	Bldg. 824 Waste Accumulation Area	1		SD-28	SC		Oils, detergent, fuels	1950s	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
AOC-A	Open Concrete Containment Box	1	118/132/ AOC-A	OT-16	SC	VCA 2/97 (Excavation/LTM)	Rinse water, detergents, pesticide residues	1977 to present	September 1988
AOC-D	Bldg. 882 Spills	1		SS-26	SC		Waste fuels	1976	September 1988
AOC-G	Atlas Substation PCB Spill	1		DP-43	SC	VCA 8/95 & 5/96 (Excavation)	PCBs	Unknown to 1979	September 1988
AOC-L	Early Missile Test Site	1		OT-37	SC		Fuels, lead oxide, nitrate compounds, acids	1947 to 1955	September 1988
AOC-O	Old Age Refueling Station	1		OT-45	SC	5/92 (Removed)	Gasoline, Diesel, JP4	1908 to 1980s	September 1988
AOC-P	Bldg. 301 Aircraft Maint. Hangar (Fuel Tank Leaks)	1		OT-44	SC	VCA 4/97	TRPH	Unknown	September 1988
AOC-T	POL Storage Tank Leaks	1		SS-02, SS-05	SC	4/95 (SVE/RA-O/ LTM)		1960-1970s	September 1988
2	Bldg 121 O/WS	2	2/119	NA	SC	VCA 4/96 (Removal & Excavation)	Rinsate and waste oil from nearby vehicle washrack	1984 to present	September 1988
15	Bldg. 309 O/WS	2	15/120	NA	SC		Rinsate and waste oils from Bldg 309	1975 to 1989	September 1988
17	Bldg. 316 O/WS	2	17/121	NA	SC	VCA 4/96 VCA 6/97	Rinse water containing hydraulic fluid from Bldg 316	Unknown	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
22	Bldg. 704 O/WS	2	21/22/ 123	NA	SC	VCA 4/96 (Removal & Excavation)	Washwater, waste oil fuels from adjacent washrack	1980 to 1991	September 1988
32	Bldg. 868 O/WS	2	32/125	NA	SC		Washwater from hangar floors containing waste oil, fuel, and fire suppressants	1986 to present	September 1988
36	Bldg. 1001 O/WS	2	36/126	NA	VCA	10/96 3/97 (Excavation)	Rinse water and waste oil from Bldg 1001	1982 to present	September 1988
39	Bldg. 1092 O/WS	2	39/127/ 135/170/ 171	FT-31	VCA	Removed 3/96 Bioventing RA-O	Waste oils, solvents, fuels	Unknown to 1990	September 1988
40	Bldg. 1166 O/WS	2	40/128/ 138/	NA	SC	VCA 3/96 (Removal & Excavation)	Rinsate containing water, oil, detergents, fuels from washrack	Unknown to 1992	September 1988
54	Bldg. 702 WAA	2	54/55	NA	SC		Waste oils stored in drums	1955 to 1987	September 1988
55	Bldg. 702A WAA	2	54/55	NA	SC		Waste oils stored in drums	1955 to 1987	September 1988
56	Bldg. 807 WAA	2		NA	SC		Drums containing waste oil, solvents from Bldg. 807 Test Cell, as well as waste fuels and product fuels	1978 to 1990	September 1988
63	Bldg. 867 WAA	2		NA	SC		Paint and thinners from Bldg 867	1984 to 1987	September 1988
71	Bldg. 1178A WAA	2		NA	SC		Paint, thinner, lacquer thinner, PD-680 solvent, toluene and acetone	1955 to 1988	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
75	DRMO Waste Storage Area	2			Removed	7/93 Removed	Hazardous Waste	1980 to present	September 1988
78	Trim Pad 3 WAA	2		NA	SC		Waste oils and hydraulic fluid	1986 to 1990	September 1988
91	Bldg. 816 Washrack	2		NA	SC		Washwater containing waste oil and fuel	Unknown	September 1988
101	Bldg. 121 Landfill	2	101/109	LF-10	SC	LTM	Domestic solid wastes, waste oils, solvents, incinerator ash	1942 to 1958	September 1988
118	Bldg. 21 Pesticide Holding Tank	2	118/132/ AOC-A	OT-16	SC	VCA 2/97 (Excavation/ LTM)	Rinse water, detergent, pesticide residue	1977 to present	September 1988
119	Bldg. 121 Waste Oil Tank	2	2/119	NA	SC	VCA 3/96 (Removal & Excavation)	Rinsate and waste oils from washrack	1984 to present	September 1988
120	Bldg. 309 Waste Oil Tank	2	15/120	NA	SC	VCA 3/96 (Removal & Excavation)	Rinsate and waste oils from Bldg 309	SWMU not located	September 1988
121	Bldg. 316 Waste Oil Tank	2	17/121	NA	SC	VCA 4/96 VCA 6/97	Rinse water containing hydraulic fluids	Unknown	September 1988
123	Bldg. 704 Waste Oil Tank	2	21/22/12 3	NA	VCA	4/97 (Excavation)	Washwater, waste oils, fuel from washrack	1980 to 1991	September 1988
124	Bldg. 752 Waste Oil Tank	2		NA	SC		Waste oils, ethylbenzene, TCE	1964 to present	September 1988
125	Bldg. 868 Fire Water Tank	2	32/125	NA	SC		Washwater containing oils, fuel, fire suppressants	1986 to present	September 1988
126	Bldg. 1001 Waste Oil Tank 1	2	36/126	NA	SC	10/96 (Excavation)	Rinse water and waste oil from Bldg 1001	1982 to present	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
127	Bldg. 1092 Waste Oil Tank	2	39/127/ 135/170/ 171	FT-31	VCA	7/96 removed by MilCon (Bioventing/ LTM)	Waste oils, solvents, fuels	Unknown to 1990	September 1988
128	Bldg. 1166 Waste Oil Tank	2	40/128/1 38	NA	SC	VCA 3/96 (Removal & Excavation)	Rinsate containing water, oils, detergents, fuels from washrack	Unknown to present	September 1988
129	Bldg. 1191 Spill Tank	2	129/178	SS-36	SC	VCA 7/95 (Excavation)	Fuels including UDMH, JP-4, IRFNA, IWFNA, aniline	1952 to 1964	September 1988
135	Bldg. 1092 O/WS Drainage Pit	2	39/127/ 135/170/ 171	FT-31	VCA	7/96 (Bioventing/ RA-O)	Waste oils, solvents, fuels	Unknown to 1990	September 1988
136	Bldg. 1119 Washrack Drainage Area	2		NA	CMI	4/97 (Bioventing)	Rinsate containing waste fuel and oils from washrack	1980 to 1990	September 1988
138	Bldg. 1166 O/WS Drainage Pit	2	40/128/1 38	OT-38	SC		Water, oils, fuels, detergents from washrack	1951 to 1979	September 1988
141	Pad 9 Drainage Pit, Drain, and Drainline	2		SD-27	SC		Rinse water possibly contaminated with radioactivity and fuels	Late 1940s to early 1950s	September 1988
155	Sludge Drying Beds	2	139/140/ 155/156/ 184	WP-49	SC		Sanitary wastes, dissolved hydrocarbons, solvents, industrial cleaners, paint strippers, methanol, acetone, formaldehyde, other EPA listed wastes	1950s to 1982	September 1988
156	Imhoff Tanks	2		WP-49	SC		Sanitary Wastes, dissolved hydrocarbons, solvents, industrial cleaners, paint strippers, methanol, acetone, formaldehyde, other EPA listed wastes	1950s to 1982	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
164	Bldg. 1080 Pond	2		NA	SC		Flightline runoff	1956 to present	September 1988
177	Bldg. 1176 Sumps	2	165/177/ 179/181	SS-39	SC	LTM	Fuels (UDMH, aniline, JP-4, IRFNA< IWFNA, LOX, JPX, dyes, solid rocket propellant, solvents, TCE)	Unknown to present	September 1988
181	Bldg. 1176 Drainage Troughs	2	165/177/ 179/181	SS-39	SC	LTM	Fuels (UDMH, aniline, JP-4, IRFNA< IWFNA, LOX, JPX, dyes, solid rocket propellant, solvents, TCE)	Unknown to present	September 1988
183	Air Base Sewer System	2		NA	SC		Domestic wastewater, stormwater	1942 to present	September 1988
184	Wastewater Recirculating Line	2	139/140/ 155/156/ 184	WP-49	SC		Domestic wastewater, stormwater		September 1988
AOC-U	Lost River Basin	2		NA	SC		Runoff from SWMUs 40, 128, 165, 177, 179, 181 including rocket fuels, drum storage wastes	Unknown	September 1988
1	Bldg. 55 O/WS	3		SD-15	SC	VCA 4/96 (Excavation)	Oil, grease, vehicle fluids from washrack	March 1984 to present	September 1988
3	Bldg. 130 O/WS	3		NA	VCA	10/96 (Excavation)	Oil, lubricants, hydraulic fluid, fuel, solvents, other vehicle fluids	Pre-1981 to 1988	September 1988
5	Bldg. 137 O/WS	3		NA	SC		Oil, lubricants, fuel, other vehicle fluids	1983 to June 1992	September 1988
6	Bldg. 193 O/WS	3		NA	SC		Engine oil, lubricants, hydraulic fluid, fuel, other vehicle fluids, solvents	1985 to present	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
7	Bldg. 198 O/WS	3		NA	SC	VCA 3/96 (Excavation)	Oil, lubricants, fuel, other vehicle fluids, Simple Green, PD-680, solvents	Pre-1960 to present	September 1988
8	Bldg. 231 O/WS	3		NA	VCA	4/97 (Excavation)	Oil, lubricants, fuel, other vehicle fluids, Simple Green, PD-680, solvents	1971 to October 1992	September 1988
9	Bldg. 282 O/WS	3		NA	SC		Oil, cleaning compounds, MEK, TCE, PCE, paint thinner and stripper, paint, varnish remover	1978 to present	September 1988
10	Bldg. 283 O/WS	3		NA	SC	VCA 8/95 (Excavation)	Waste oil, fuel, hydraulic fluid, kerosene	1978 to 1991	September 1988
11	Bldg. 300 O/WS	3		NA	SC	VCA 4/96 (Removal & Excavation)	Oil, alkaline cleaners, PD-680, solvents	1977 to 1991	September 1988
12	Bldg. 304 O/WS	3	12/13	NA	SC	VCA 4/96 (Removal & Excavation)	Oil, grease, fire suppressants, paint, solvents, aircraft soap, fuel	February 1980 to present	September 1988
13	Bldg. 304A O/WS	3	12/13	NA	SC	VCA 4/96 (Removal & Excavation)	Oil, grease, fire suppressants, paint, solvents, aircraft soap, fuel	February 1980 to present	September 1988
14	Bldg. 306 O/WS	3		NA	SC	VCA 6/96 (Removal & Excavation)	Waste oil, fuel, PD-680, methyl chloride, solvents, alkaline cleaners, ammonium hydroxide, furfuryl alcohol, phosphoric solution, chromic acid	1969 to present	September 1988
16	Bldg. 315 O/WS	3		NA	SC		Oil, hydraulic fluid, JP-4, MIBK, MEK	1969 to present	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
18	Bldg. 500 O/WS	3		NA	SC	VCA 8/95 (Removal & Excavation)	Engine oil, hydraulic fluid, JP-4, battery acid	Unknown	September 1988
19	Bldg. 638 O/WS	3	19/20/ 229	SS-59	VCA	3/96 (DPSVE)	Engine oil, jet fuel, PD-680, solvents	1977 to present	September 1988
20	Bldg. 639 O/WS	3	19/20/ 229	SS-59	VCA	5/96 (DPSVE)	Engine oil, grease, jet fuel, solvents	Pre-1978 to present	September 1988
23	Bldg. 800 O/WS	3		NA	SC	11/96 (Removal & Excavation)	Engine oil, grease, hydraulic fluid, PD-680, Simple Green, aircraft soap	July 1977 to present	September 1988
24	Bldg. 801 O/WS	3		NA	SC		Engine oil, grease, hydraulic fluid, fuel, PD-680, ethanol, TCA, aircraft soap	1979 to present	September 1988
25	Bldg. 805 O/WS	3		NA	SC	VCA 3/96 (Removal & Excavation)	Engine oil, other vehicle fluids	April 1987 to present	September 1988
26	Bldg. 809 O/WS	3		NA	SC		Engine oil, hydraulic fluid, solvents, paint thinner, and stripper, paint	1978 to 1982	September 1988
27	Bldg. 810 O/WS	3		NA	SC	VCA 3/96 (Removal & Excavation)	Fuel and synthetic oils, grease, hydraulic fluid, JP-4, PD-680, TCA, Freon 113	April 1977 to 1990	September 1988
28	Bldg. 822 O/WS	3		NA	SC	4/97 (Removal & Excavation)	Engine oil, grease, hydraulic fluid, antifreeze, PD-680, ethanol, TCA, aircraft soap, Simple Green	1977 to April 1991	September 1988
29	Bldg. 827 O/WS	3	29/230	SS-60	SC	3/96 (Removal)	Engine oil, grease, hydraulic fluid, fuel, PD-680, aircraft soap	1977 to April 1991	September 1988
30	Bldg 830 O/WS	3		NA	SC		Engine oil, lubricants, hydraulic fluid, fuel	1986 to present	September 1988

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

SWMU #	SWMU Name	Table	Group ID	ERP Site No.	Status	Action	Material Disposed of	Dates of Operation	Dates of Identification
31	Bldg. 855 O/WS	3		NA	SC	3/96 VCA (Removal & Excavation)	Engine oil, grease, hydraulic fluid, other vehicle fluids	December 1982 to present	September 1988
33	Bldg. 869 O/WS	3		NA	SC		Engine oil, grease, hydraulic fluid, other vehicle fluids, diesel and gasoline, PD-680, solvents	January 1985 to present	September 1988
34	Bldg. 902 O/WS	3		NA	SC		Engine oil, grease, hydraulic fluid, other vehicle fluids, fuel	March 1982 to present	September 1988
35	Bldg. 903 O/WS	3		NA	SC	VCA 3/96 (Removal & Excavation)	Engine oil, grease, hydraulic fluid, primer and paint, paint stripper and thinner, PD-680, MEK, toluene, sandblast residuals	April 1986 to April 1991	September 1988
37	Bldg. 1080 O/WS	3		NA	SC		Engine oil, grease, hydraulic fluid, Simple Green, aircraft soap, other vehicle fluids, PD-680	1974 to present	September 1988
38	Bldg. 1080A O/WS	3		NA	SC		Engine oil, hydraulic fluid, aircraft soap, other vehicle fluids	Pre-1981 to 1991	September 1988
41	Bldg. 1266 O/WS	3		NA	SC	VCA 3/96 (Removal & Excavation)	Engine oil, hydraulic fluid, antifreeze, other vehicle fluids, diesel fuel, aircraft soap	January 1987 to present	September 1988
229	T-38 Test Cell Fuel Spill	3	19/20/ 229	SS-59	VCA	1/95 (DPSVE) 6/96 (DPSVE)	JP-4	1966 to present	July 1993
230	Bldg. 828 Fuel Spill	3	29/230	SS-60	SC	5/96 (DPSVE)	Unleaded gasoline, diesel, JP-4	1977 to June 1991	July 1993
231	Incinerator/Landfill	3		LF-58	SC		Unconventional Fuel & Waste	Unknown	July 1993
AOC-V	Officer's Club	3		SS-57	VCA	10/95 (Air Sparge/SVE)	Diesel fuel, sulfuric compounds	Pre-1975	July 1993

Notes:

AFB = Air Force Base

JPX = 1-1 JP-4 and UDMH

RA-O = Remedial Action-Operation

TABLE D2-3 (Continued)

HSWA SWMU SUMMARY TABLE FOR HOLLOMAN AFB

AOC = Area of Concern
CMI = Corrective Measures Implementation
CMS = Corrective Measures Study
DPSVE = Dual-Phase Soil Vapor Extraction
EPA = U.S. Environmental Protection Agency
ERP = Environmental Resources Program
HSWA = Hazardous and Solid Waste Amendments
HTH = High-Test Hypochlorite
IRFNA = Inhibited Red Fuming Nitric Acid
IWFNA = Inhibited White Fuming Nitric Acid
LOX = Liquid Oxygen
LTM = Long-Term Monitoring
LTO = Long-Term Operation
MEK = Methyl Ethyl Ketone
MIBK = Methyl Isobutyl Ketone
NA = Not Applicable
O/WS = Oil/Water Separator
PCBs = Polychlorinated Biphenyls
PCE = Tetrachloroethyene
POL = Petroleum, Oil, and Lubricants
RFI = RCRA Facility Investigation
SC = Site Closed (Permit modification submitted, but not necessarily signed by State at this date).
SVE = Soil Vapor Extraction
SWMU = Solid Waste Management Unit
TCA = Trichloroethane
TCE = Trichloroethene
TRPH = Total Recoverable Petroleum Hydrocarbons
UDMH = Unsymmetrical Dimethylhydrazine
VCA = Voluntary Corrective Action (See note)
WAA = Waste Accumulation Area

Note: The term "Voluntary Corrective Action (VCA)" is roughly equivalent to the term "Interim Remedial Action (IRA)" used in the ERP Program.

D2.3 RESTORATION-RELATED COMPLIANCE STRATEGY

This section summarizes the strategies or compliance activities at Holloman AFB. These activities include underground storage tanks (USTs) and solid waste management units (SWMUs).

D2.3.1 Underground Storage Tanks

No UST Program activities are scheduled for the current fiscal year.

D2.3.2 Solid Waste, PCBs and Other Compliance Programs

The following compliance activities are scheduled through FY 2004:

- Quarterly reports on hazardous and solid waste amendments (HSWA) permit status are sent to NMED
- Permit modification to get public approval for proposed remedies and No Further Action (NFA) status
- LTM sampling.

TABLE D2-4 ESTIMATED FY COST SUMMARY FOR HOLLOMAN AFB COMPLIANCE SITES

Management Action Plan

Holloman AFB, New Mexico

(in thousands of dollars)

Program Area/ Project Description	FY04	FY05	FY06	FY07	FY08	LTM	Total
Total							

Note: Cost data not available as of this update

APPENDIX D3

RESERVED FOR HOLLOMAN AFB

New Mexico Cleanup Standards

And

TPH Screening Guidelines

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D3 INTRODUCTION

This appendix provides excerpts from New Mexico cleanup standards for water and soil, and a copy of the New Mexico TPH Screening Guidelines.

D3.1 NEW MEXICO CLEANUP STANDARDS

TABLE D3-1 NEW MEXICO DRINKING WATER STANDARDS

Contaminant	Maximum Contaminant Level (mg/L)
Inorganic Contaminants	
Antimony	0.006
Asbestos	7 million fibers/liter (longer than 10 Fm)
Arsenic	0.05
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cyanide	0.2
Fluoride	4.0
Mercury	0.002
Nickel	0.1
Nitrate (as N)	10
Nitrite (as N)	1
Total Nitrate and Nitrite (as N)	10
Selenium	0.05
Thallium	0.002
Organic Contaminants	
Apply to community and non-transient, non-community water systems	
Alachlor	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
Dibromochloropropane	0.0002
2,4-D	0.07
Ethylene dibromide	0.00005
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Polychlorinated biphenyls	0.0005
Pentachlorophenol	0.001
Toxaphene	0.003

TABLE D3-1 (Continued)
NEW MEXICO DRINKING WATER STANDARDS

Contaminant	Maximum Contaminant Level (mg/L)
2,4,5-TP	0.05
Benzo(a)pyrene	0.0002
Dalapon	0.2
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Glphosate	0.7
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Oxamyl (Vydate)	0.2
Picloram	0.5
Simazine	0.004
1,3,7,8-TCDD (Dioxin)	0.00000003
Vinyl Chloride	0.002
Benzene	0.005
Carbon Tetrachloride	0.005
1,2-Dichloroethane	0.005
Trichloroethylene	0.005
para-Dichlorobenzene	0.075
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.2
cis-1,2-Dichloroethylene	0.07
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetracloroethylene	0.005
Toluene	1
trans-1,2-Dichloroethylene	0.1
Xylenes (total)	10
Dichloromethane	0.005
1,2,4-Trichlorobenzene	0.07
1,1,2-Trichloroethane	0.005
Apply to water systems which serve 10,000 or more individuals and add a disinfectant to the water	
Total Trihalomethanes	0.10

Source: New Mexico Drinking Water Regulations, New Mexico Environmental DEPARTMENT, SANTA FE, NEW MEXICO, JANUARY 1, 1995

TABLE D3-2 NEW MEXICO SURFACE WATER QUALITY STANDARDS

Contaminant	Standard[a]
Domestic Water Supplies	
Dissolved Arsenic	0.05 mg/L
Dissolved Barium	1.0 mg/L
Dissolved Cadmium	0.010 mg/L
Dissolved Chromium	0.05 mg/L
Dissolved Lead	0.05 mg/L
Total Mercury	0.002 mg/L
Dissolved Nitrate	10.0 mg/L
Dissolved Selenium	0.05 mg/L
Dissolved Silver	0.05 mg/L
Dissolved Cyanide	0.2 mg/L
Dissolved Uranium	5.0 mg/L
Radium-226 + Radium-228	30.0 pCi/L
Tritium	20,000 pCi/L
Gross alpha	15 pCi/L
Irrigation	
Dissolved Aluminum	5.0 mg/L
Dissolved Arsenic	0.10 mg/L
Dissolved boron	0.75 mg/L
Dissolved Cadmium	0.01 mg/L
Dissolved Chromium	0.10 mg/L
Dissolved Cobalt	0.05 mg/L
Dissolved Copper	0.20 mg/L
Dissolved Lead	5.0 mg/L
Dissolved Molybdenum	1.0 mg/L
Dissolved Selenium	0.13 mg/L
Dissolved Selenium in presence of >500 mg/L SO_4	0.25 mg/L
Dissolved Vanadium	0.1 mg/L
Dissolved Zinc	2.0 mg/L
Fisheries	
Acute Standards[b]	
Dissolved Aluminum	750 μg/L
Dissolved Beryllium	130 μg/L
Total Mercury	2.4 μg/L
Total Recoverable Selenium	20.0 μg/L
Dissolved Silver[c,d]	$e^{(1.72[\ln(\text{hardness})]-6.52)}$ μg/L
Cyanide, amenable to chlorination	22.0 μg/L
Total chlordane	2.4 μg/L
Dissolved Cadmium	$e^{(1.128[\ln(\text{hardness})]-3.828)}$ μg/L

TABLE D3-2 (Continued)
NEW MEXICO SURFACE WATER QUALITY STANDARDS

Contaminant	Standard[a]
Dissolved Chromium[c,d]	$e^{(0.819[\ln(hardness)]+3.688)}$ µg/L
Dissolved Copper	$e^{(0.9422[\ln(hardness)]-1.464)}$ µg/L
Dissolved Lead	$e^{(1.273[\ln(hardness)]-1.46)}$ µg/L
Dissolved Nickel	$e^{(0.8460[\ln(hardness)]+3.3612)}$ µg/L
Dissolved Zinc	$e^{(0.8473[\ln(hardness)]+0.8604)}$ µg/L
Total Chlorine residual	19 µg/L
Chronic Standards[e]	
Dissolved Aluminum	87.0 µg/L
Dissolved Beryllium	5.3 µg/L
Total Mercury	0.012 µg/L
Total Recoverable Selenium	2.0 µg/L
Cyanide, amenable to chlorination	5.2 µg/L
Total Chlordane	0.0043 µg/L
Dissolved Cadmium[c]	$e^{(0.7852[\ln(hardness)]-3.49}$ µg/L
Dissolved Chromium[d]	$e^{(0.819[\ln(hardness)]+1.561)}$ µg/L
Dissolved Copper	$e^{(0.8545[\ln(hardness)]-1.465)}$ µg/L
Dissolved Lead	$e^{(1.273[\ln(hardness)]-4.705)}$ µg/L
Dissolved Nickel	$e^{(0.846[\ln(hardness)]+1.1654)}$ µg/L
Dissolved Zinc	$e^{(0.8473[\ln(hardness)]+0.7614)}$ µg/L
Total chlorine residual	11.0 µg/L
Livestock Watering	
Dissolved Aluminum	5.0 mg/L
Dissolved Arsenic	0.2 mg/L
Dissolved Boron	5.0 mg/L
Dissolved Cadmium	0.05 mg/L
Dissolved Chromium[d]	1.0 mg/L
Dissolved Cobalt	1.0 mg/L
Dissolved Copper	0.5 mg/L
Dissolved Lead	0.1 mg/L
Total Mercury	0.01 mg/L
Dissolved Selenium	0.05 mg/L
Dissolved Vanadium	0.1 mg/L
Dissolved Zinc	25.0 mg/L
Radium-226 + Radium-228	30.0 pCi/L
Tritium	20,000 pCi/L
Gross alpha	15 pCi/L

Source: Standards for Interstate and Intrastate Streams, New Mexico Water Quality Control Commission, Santa Fe, New Mexico, January 23, 1995.

[a] When a classified water of the State has more than a single designated use, the applicable numeric standards shall be the most stringent of those established for such classified water.

[b] The acute standards shall be applied to any single grab sample. Acute standards shall not

TABLE D3-2 (Continued)
NEW MEXICO SURFACE WATER QUALITY STANDARDS

be exceeded.

[c] For numeric standards dependent on hardness, hardness (as mg $CaCO_3/L$) shall be determined as needed from available verifiable data sources including, but no limited to, the U.S. Environmental Protection Agency's STORET water quality database.

[d] The standards for chromium shall be applied to an analysis which measures both the trivalent and hexavalent ions.

[e] The chronic standards shall be applied to the arithmetic mean of four samples collected on each of four consecutive days. Chronic standards shall not be exceeded more than once every three years.

TABLE D3-3 NEW MEXICO GROUNDWATER STANDARDS

Contaminant	Standard[a]
Human Health Standards	
Arsenic	0.1
Barium	1.0
Cadmium	0.01
Chromium	0.05
Cyanide	0.2
Fluoride	1.6
Lead	0.05
Total Mercury	0.002
Nitrate	10.0
Selenium	0.05
Silver	0.05
Uranium	5.0
Radium-226 and -228	30.0 pCi/L
Benzene	0.01
Polychlorinated biphenyls	0.001
Toluene	0.75
Carbon Tetrachloride	0.01
1,2-dichloroethane	0.01
1,1-dichloroethylene	0.005
1,1,2,2-tetrachloroethylene	0.02
1,1,2-trichloroethylene	0.1
Ethylbenzene	0.75
Total Xylenes	0.62
Methylene chloride	0.1
Chloroform	0.1
1,1-dichloroethane	0.025
Ethylene dibromide	0.0001
Total Xylenes	0.62
Methylene chloride	0.1
Chloroform	0.1
1,1-dichloroethane	0.025
Ethylene dibromide	0.0001
1,1,1-Trichloroethane	0.06
1,1,2-Trichloroethane	0.01
1,1,2,2-tetrachloroethane	0.01
Vinyl chloride	0.001
PAHs: total naphthalene plus monomethylnaphthalenes	0.03
Benzo(a)pyrene	0.0007

TABLE D3-3 (Continued)
NEW MEXICO GROUNDWATER STANDARDS

Contaminant	Standard[a]
Other Standards for Domestic Water Supply	
Chloride	250.0
Copper	1.0
Iron	1.0
Manganese	0.2
Phenols	0.005
Sulfate	600.0
Total Dissolved Solids	1000.0
Zinc	10.
pH	between 6 and 9
Standards for Irrigation Use	
Aluminum	5.0
Boron	0.75
Cobalt	0.05
Molybdenum	1.0
Nickel	0.2

Source: Water Quality Control Commission Regulations, New Mexico Water Quality Control Commission, Santa Fe, New Mexico, November 18, 1993.

[a] All standards are in mg/L unless otherwise noted

TABLE D3-4 NEW MEXICO UST STANDARDS FOR SOIL AND GROUNDWATER

Contaminant	Action Level
Water	**µg/L**
Benzene	10
Ethylbenzene	750
Toluene	750
Xylenes	620
EDB	0.1
EDC	10
MTBE	100
Naphthalene	30
1,1,2 TCE	100
PCE	20
Benzo(a)pyrene	0.7
Lead	50
Iron	100
Manganese	200
Soil	**mg/kg**
Benzene	10
Total BTEX	100 (field) 50 (lab)
TPH	100

Source: UST Soil/Water Sampling and Disposal Guidelines, Underground Storage Tank Bureau, State of New Mexico Environmental Department, March 6, 1995.

TPH - Total Petroleum Hydrocarbons

D3.2 NEW MEXICO ENVIRONMENT DEPARTMENT TPH SCREENING GUIDELINES

Some sites with areas of soil contamination resulting from releases of petroleum products such as jet fuel and diesel wish to use total petroleum hydrocarbon (TPH) sampling results to delineate the extent of petroleum-related contamination at these sites and ascertain if the residual level of petroleum products does not represent an unacceptable risk to future users of the site. TPH results represent a complex mixture of compounds, some of which are regulated constituents and some compounds that are not regulated. In addition, the amount and types of the constituent compounds in TPH differ widely depending on which petroleum product was spilled and how the spill has weathered. This variability makes it difficult to determine the toxicity of weathered petroleum products in soil solely from TPH results. **Therefore, remediation of spills and corrective action sites cannot be based solely on results of TPH sampling; these TPH guidelines must be used in conjunction with the screening guidelines for individual petroleum-related contaminants in Table 3 and other contaminants as applicable.**

The screening levels for each petroleum carbon range from the Massachusetts Department of Environmental Protection (MADEP) Volatile Petroleum Hydrocarbons/Extractable Petroleum Hydrocarbons (VPH/EPH) approach and the percent composition table below were used to generate screening levels corresponding to total TPH. Except for waste oil, the information in the compositional assumptions table was obtained from Table 5-1 of the Massachusetts Department of Environmental Protection guidance document *Implementation of the MADEP VPH/EPH Approach Final Draft June 2001*. TPH toxicity was based only on the weighted sum of the toxicity of the hydrocarbon fractions listed in Table 1.

Table 1: TPH Compositional Assumptions in Soil

Petroleum Product	C11-C22 Aromatics	C9-C18 Aliphatics	C19-C36 Aliphatics
Diesel #2/ new crankcase oil	60%	40%	0%
#3 and #6 Fuel Oil	70%	30%	0%
Kerosene and jet fuel	30%	70%	0%
Mineral oil dielectric fluid	20%	40%	40%
Unknown oil [a]	100%	0%	0%
Waste Oil[b]	0%	0%	100%

[a] Sites with oil from unknown sources must be tested for VOCs, SVOCs, metals, and PCBs to determine if other potentially toxic constituents are present. The TPH guidelines in Table 2 are not designed to be protective of exposure to these constituents therefore they must be tested for, and compared to, their individual NMED soil screening guidelines.

[b] Compositional assumption for waste oil developed by NMED is based on review of chromatographs of several types of waste oil. Sites with waste oil must be tested for VOCs, SVOCs, metals, and PCBs to determine if other potentially toxic constituents are present. The TPH guidelines in Table 2 are not designed to be protective of

exposure to these constituents therefore they must be tested for, and compared to, their individual NMED soil screening guidelines.

A TPH screening guideline was calculated for each of the types of petroleum product based on the assumed composition from the above table for petroleum products and the direct soil standards incorporating ceiling concentrations given in the MADEP VPH/EPH Excel spreadsheet for each of the carbon fractions. Ground water concentrations are based on the weighted sum of the noncarcinogenic toxicity of the petroleum fractions assuming the water is drinking water.

Table 2: TPH Screening Guidelines

Petroleum Product	TPH		Concentration in Ground Water (mg/L)
	Residential Direct Exposure (mg/kg)	Industrial Direct Exposure (mg/kg)	
Diesel #2/crankcase oil	880	2200	1.8
#3 and #6 Fuel Oil	860	2150	1.4
Kerosene and jet fuel	940	2350	3.0
Mineral oil dielectric fluid	1560	3400	3.7
Unknown oil [a]	800 2000		2.3
Waste Oil [b]	2500 5000	Petroleum-	Related Contaminants
Gasoline	Not applicable	Not applicable	Petroleum-Related Contaminants

Mineral oil based hydraulic fluids can be evaluated for petroleum fraction toxicity using the screening guidelines from Table 2 specified for waste oil, because this type of hydraulic fluid is composed of approximately the same range of carbon fractions as waste oil. However, these hydraulic fluids often contain proprietary additives that may be significantly more toxic than the oil itself; these additives must be considered on a site- and product-specific basis (see ATSDR hydraulic fluids profile reference). **Use of alternate screening guideline values requires prior written approval from the New Mexico Environment Department.** TPH screening guidelines in Table 2 must be used in conjunction with the screening levels for petroleum-related contaminants given in Table 3 because the TPH screening levels are NOT designed to be protective of exposure to these individual petroleum-related contaminants. Table 3 petroleum-related contaminants screening levels are based on the New Mexico Environment Department soil screening levels (NMED SSLs) released in December of 2000.

The list of petroleum-related contaminants does not include PAHs with individual screening levels that would exceed the total TPH screening levels (acenaphthene, anthracene, flouranthene, flourene, and pyrene). In addition, these TPH screening guidelines are based solely on human health, not ecological risk considerations, protection of surface water, or potential indoor air impacts from soil vapors. Potential soil vapor impacts to structures or utilities are not addressed by these guidelines. Site-specific investigations for potential soil vapor impacts to structures or utilities must be done to assure that

screenings are consistently protective of human health, welfare or use of the property. NMED believes that use of these screening guidelines will allow more efficient screenings of petroleum release sites at sites while protecting human health and
the environment. Copies of the references cited below are available on the MADEP website at http://www.state.ma.us/dep/bwsc/vph_eph.htm and the NMED website at:

http://www.nmenv.state.nm.us/HWB/guidance.html.

Table 3. Petroleum-Related Contaminants Screening Guidelines

Petroleum-Related Contaminants	Values for Direct Exposure to Soil		NMED DAF 20 GW protection (mg/kg in soil)	NMED DAF 1[f] GW protection (mg/kg in soil)
	NMED Residential SSL (mg/kg)	NMED Industrial SSL (mg/kg)		
Benzene	6	14	0.06	0.003
Toluene	180	180	5	0.02
Ethyl benzene	68	68	8	0.4
Xylene	63	63	100	5
Naphthalene	53	180	0.2	0.01
2-methyl naphthalene	1000 [e]	2500 [e]	---[e]	---[e]
Benzo(a)anthracene	6.2	26	40	2
Benzo(b)fluoranthene	6.2	26	20	0.8
Benzo(k)fluoranthene	62	260	200	8
Benzo(a)pyrene	0.62	2.6	100	6
Chrysene	610	2500	1000	50
Dibenz(a,h) anthracene	0.62	2.6	9	0.5
Indeno(1,2,3-c,d) pyrene	6.2	26	40	2

[e] No NMED value available, value taken from MADEP paper

[f] For contaminated soil in contact with ground water

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 1997. Toxicological Profile for Hydraulic fluids.

Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup and Office of Research and Standards. 1994. "Background Documentation for the Development of the MCP Numerical Standards."

Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup and Office of Research and Standards. 2001. "Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach Final Draft June 2001."

New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program. 2000. "Technical Background Document for Development of Soil Screening Levels." Document # NMED-00-008.

APPENDIX D4

HOLLOMAN AFB STRATEGIC PLAN

Headquarters, Air Combat Command
Langley Air Force Base,
Virginia

Strategic Plan

January 1995

(Updated December 2001)

49 CES/CEV
Holloman Air Force Base,
New Mexico

HOLLOMAN AIR FORCE BASE

STRATEGIC PLAN

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HOLLOMAN AIR FORCE BASE

STRATEGIC PLAN

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1.0 INTRODUCTION

As a result of past waste and resource management practices at Holloman Air Force Base (AFB), areas of the base have become contaminated by various toxic and/or hazardous compounds. In response, a number of environmental restoration projects have been initiated at the base. These restoration projects are initiated through the Environmental Restoration Program (ERP) and the Environmental Compliance Program. The ERP is a Department of Defense (DoD) initiative with funds furnished to the site from the Defense Environmental Restoration Account (ERA). The Environmental Compliance Program is base-specific and is funded from the Environmental Compliance Operations and Maintenance Account. The restoration program is executed to comply with applicable laws and regulations and ensures present waste and resource management practices are carried out in a manner protective of human health and the environment.

1.1 OVERVIEW OF STRATEGIC PLAN

This Strategic Plan outlines a comprehensive strategy and the tools available to accelerate the base's environmental restoration program and associated environmental compliance programs. The tools that are considered in this plan focus upon contracting mechanisms, use of risk assessments, the Superfund Accelerated Cleanup Model (SACM), and effectively packaging sites together. The Strategic Plan is a dynamic living document that will require periodic revision as programmatic, regulatory, and technological changes affect program execution or status.

1.1.1 Strategic Plan Objectives

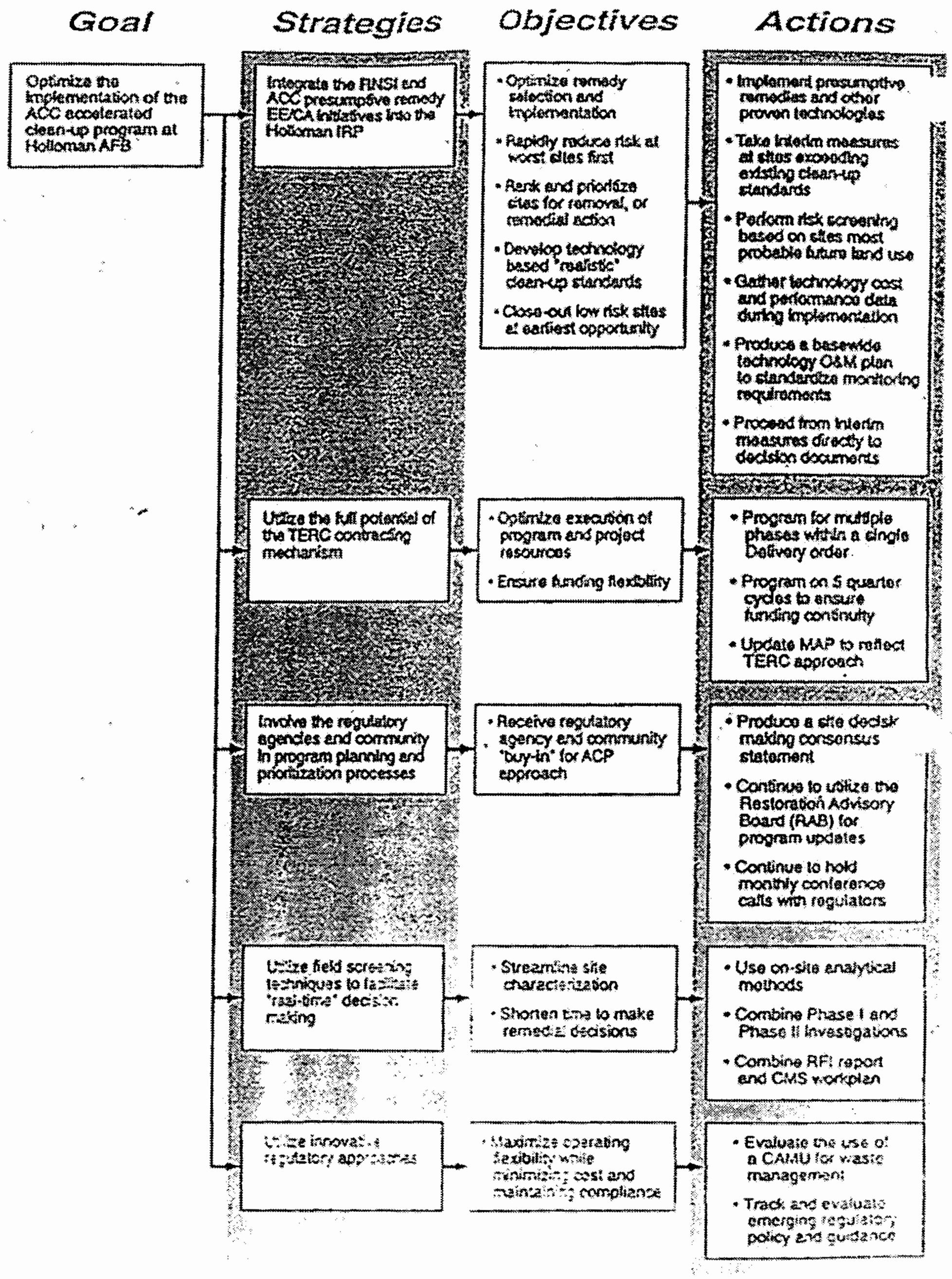
The objective of the Strategic Plan is to provide the conceptual plan and the tools to accelerate the base's restoration program to achieve early site close out. Reducing environmental restoration costs while being protective of human health and the environment are equally important objectives that are considered within the Strategic Plan.

1.1.2 Accelerated Cleanup Program

The Accelerated Cleanup Program (ACP) is a programmatic concept that was developed by the Air Force Air Combat Command (ACC) in 1993. The ACP concept embraced the idea of having a dedicated team of professionals drawn from bases, ACC, the U.S. Army Corps of Engineers (USACE), and the regulatory agencies to implement base restoration activities. These dedicated professionals were to form a formal partnership with each agency signing up to the philosophy and goals of the ACP. The ACP was established to perform site restoration activities using sound risk assessments based on realistic land use data. The ACP needed a contracting mechanism that would allow one contractor to perform the gamut of environmental restoration activities at a given installation. The USACE, Omaha District, procured Total Environmental Restoration Contract (TERC) contractors in 1993 to execute the ACP. TERC #4 utilizes Holloman AFB as its anchor base.

Figure 1-1 illustrates the concept of the ACP. The ACP has expanded since 1993 to include several additional restoration initiatives that are discussed in Section 3.0.

Figure 1-1



Holloman AFB Accelerated Clean-up Program (ACP)
Strategies, Objectives, and Actions

TABLE 1-1

TERCTEAM MEMBERS			
Name	**Title**	**Telephone/Fax**	**Role/Responsibility**
Daniel Holmquist	Project Manager	(505) 572-5395/ (505) 572-7015	Remedial Project Manager/ Holloman AFB
David Scruggs	Restoration Chief	(505) 572-5395/ (505) 572-7015	Remedial Project Manager/ Holloman AFB
Allen Chang	Project Manager	(214) 655-7442/ (214) 655-6660	Project Manager/EPA Region VI
Julie Jacobs	Project Manager	(505) 428-2554/ (505) 827-2965	Project Manager/ NMED CERCLA DSMOA
Cornelius Amindyas	Project Manager	(505) 841-9488/ (505) 884-9254	Project Manager/NMED RCRA DSMOA, Hazardous Waste Bureau
George Fish	Project Manager	(505) 479-6095/ (505) 479-4297	Project Manager/USACE-Albuquerque
Jim Haggins	Project Manager	(757) 764-4420/ (757) 764-9369	Project Manager/HQACC CEVR
Tom Zink	Project Manager	(402) 221-7666/ (402) 221-7838	Project Manager/USACE-Omaha
Frank Gardner	Program Manager	(970) 216-7819	Bhate Environmental
James Morning	Site Manager	(505) 679-2100/ (505) 679-2148	Site Manager/Foster Wheeler Environmental Corporation

Notes:
AFB = Air Force Base
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
DSMOA = Defense and State Memorandum of Agreement
EPA = U.S. Environmental Protection Agency
HQACC = Headquarters Air Combat Command
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act
TERC = Total Environmental Restoration Contract
USACE = U.S. Army Corps of Engineers

1.1.3 Regulatory Concerns

Regulatory concerns from the U.S. Environmental Protection Agency (EPA) and the New Mexico Environmental Department (NMED) include:

- Acceleration of the program affects the regulators ability to respond to technical and proposed plan submittals
- Regulators need to ensure that remedial actions are protective of human health and the environment
- The NMED is concerned about access to additional DoD Defense State Memorandum of Agreement (DSMOA) funds
- There are jurisdictional concerns between federal and state regulators on some sites

1.1.4 Overview/Background of Existing Sites

There are 64 ERP sites associated with Holloman AFB, 60 of which are located on the main Base. Three remote sites are located in southern New Mexico, and one remote site is located in extreme west Texas. Of the 64 ERP sites, three are in the PA/SI or RI stages, 9 are undergoing RA-O, 15 are closed with long-term monitoring, one is undergoing IRA, and 36 are response complete with no RA-O or LTM.

The base environmental compliance program includes a total of 231 Solid Waste Management Units (SWMUs) as defined by the Resource Conservation and Recovery Act (RCRA). Each SWMU is assigned a unique identification number within the permit. There are 119 SWMUs that require investigation. The SWMUs are listed on the base's RCRA permit in three tables: Table I includes 40 SWMUs, Table II includes 40 SWMUs, and Table III includes 39 SWMUs. A number of these SWMUs are also ERP sites and must be managed in accordance with both the ERP and the base compliance program. There are three other environmental compliance sites not listed in the base permit that require restoration: T-38 Test Cell, Bldg. 828, and Holloman Lakes.

1.1.5 TERC Team

The Holloman AFB TERC Team has been established to accelerate the base's restoration program and is led by the Base Remedial Program Manager (RPM). The TERC Team meets regularly to resolve programmatic, regulatory, and technical issues and ensures that the base's restoration program stays on schedule. The TERC Team members are listed in Table 1-1. The team members signed their partnering agreement on April 5, 1994 and the document is on file at the base's environmental office. The team members are committed to implementing the ACP and the following:

- Open and frequent communication, including monthly conference calls and semi-annual meetings
- Establishment and maintenance of appropriate cleanup standards that protect human health and environment and are in full compliance with appropriate regulations
- Establishment and maintenance of schedules
- Review and revise objectives at periodic meetings
- High quality products
- Concurrent development of plans and deliverables

1.2 ORGANIZATION OF STRATEGIC PLAN

Section 1.0 outlines the objectives of the Strategic Plan, provides an overview of the ACP, examines regulatory concerns, provides a brief overview/background of existing sites, and introduces the TERC Team and partnerships formed to implement the Strategic Plan. Section 2.0 provides an overview of the regulatory framework within which the base must execute its restoration program. Section 3.0 examines restoration initiatives and tools that can help in accelerating the base's restoration program. Section 4.0 outlines the implementation strategy for the Strategic Plan and introduces the Execution Plan.

2.0 REGULATORY FRAMEWORK

This chapter provides an overview of the statutory and regulatory framework within which the base must execute its restoration program. The chapter provides an overview of applicable State and Federal regulations that bear most directly on corrective action, and also discusses several regulations still in the proposed stage which may affect the base's program. Also summarized are DoD guidance documents, base-specific agreements, and DSMOA.

Table 2-1 presents the specific regulated media and/or actions that are evaluated in relation to both State of New Mexico regulatory programs and Federal regulatory programs. The following media and/or activities are addressed:

- Surface and groundwater quality
- Surface and groundwater discharge
- Groundwater extraction
- Underground storage tanks
- Air emissions
- Hazardous waste
- Solid waste
- DoD guidance documents
- Emergency planning and community right-to-know
- Pollution prevention
- Proposed State regulations
- Proposed Federal regulations
- Base specific agreements
- Defense State Memorandum of Agreement

Table 2-1 provides a brief summary of the enforcing agency, regulatory citations, and applicability to Holloman AFB's ACP.

TABLE 2-1

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Surface and groundwater quality				
- Groundwater Quality Standards	NMWQCC Reg. Section 3-104 NMEID/USTR Part XII Section 1219 (w/r to USTs)	NMED/GWPRB	- Dissolved pollutant standards apply to groundwater that has TDS levels <10,000 mg/l.	- Majority of groundwater at Holloman AFB contains TDS >10,000 mg/l, therefore dissolved standards do not apply at the site. - Removal of any measurable LNAPL is required at Holloman AFB.
- Surface Water Quality Standards	NMWQCC Regs. 1-100.A.	NMED/SWQB	- Establishes surface water quality standards and non-degradation policy.	- Dissolved pollutant standards for surface water apply at Holloman AFB.
Surface and groundwater discharge				
- Planned subsurface effluent discharges of nonhazardous waste to infiltration galleries, injection wells, non-household septic systems, surface impoundments, etc.	NMWQCC Parts 1, 3, and 5	NMED/GWPRB	- Requires the filing of a discharge plan with specified requirements, and established discharge limits.	
- Accidental releases from pipelines, above-ground storage tanks, underground storage tanks, surface spills, etc.	NMWQCC	NMED/GWPRB and/or NMED/SWQB	- Requires notification to NMED within 24 hours.	
- Surface effluent discharge to surface waters (including arroyos and ephemeral streams).	CWA 40CFR122.2	USEPA Region VI (issuing authority) NMED/SWQB (Review and certification authority)	- Requires NPDES permit to discharge any pollutant to navigable waters. - Exceptions include wastewater treatment systems (ponds and lagoons) and certain on-site response actions conducted under Superfund.	- Applicable to Holloman when evaluating design options for discharging recovered water associated with Corrective Action activities.
- Surface effluent discharge via any stormwater convalance system.	CWA 40CFR112 Stormwater NOI	USEPA Region VI	- Requires permit for discharges from any stormwater system associated with an industrial activity (includes: industrial facilities, transportation facilities with vehicle maintenance, hazardous waste and TSD facilities, landfills, construction area larger than 5 acres, etc.).	
- Discharge of dredged or fill material into wetlands	CWA Wetlands Permit Section 404	USEPA Region VI	- Regulates discharge of dredged or fill material to protect wetland habitats.	- Not anticipated to apply to Holloman, however, any cleanup activities in or near wetlands should be carefully monitored.
- Discharge of dredged material into waters of the U.S.	58 CFR 45008	USACE	- Requires permit to add or re-dispose of dredged material that destroys or degrades waters of the U.S.	- Disposing of dredged materials to waters of the U.S. should not be considered as an available option at Holloman AFB.

TABLE 2-1 (Cont)

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Groundwater Extraction				
- Extraction of groundwater associated with proposed treatment systems	NMSEO Articles 1 through 7	NMSEO	- Requires permit to be obtained and if the majority of the extracted groundwater is not returned, water rights need to be purchased.	- If Holloman does not own water rights, then must apply for NMSEO permit and show deminimus loss.
Underground Storage Tanks				
- Permit, operation, closure, and corrective actions from releases.	NMEIB/USTR Parts XII and XIII	NMED/USTB	- Establishes operational standards for maintaining UST. - Specifically excludes oil-water separators, flow through process tanks, sumps, and hydraulic lifts.	
- Soil, LNAPL, and Groundwater Restoration Levels and Remediation Requirements	NMEIB/USTR Part XII Section 1209	NMED/USTB	- Specifies soil restoration levels for UST releases.	- The established state restoration levels have been superseded at Holloman AFB to TPH < 1,000 ppm, Benzene < 25 ppm, and removal of measurable LNAPL (NMED correspondence dated 1/25/93).
- Unable to obtain the regulatory standards with BAT.	NMEIB/USTR Part XII Section 1220	NMED/USTB	- Provides a mechanism for the UST owner/operator to petition the NMED/USTB for less stringent cleanup standards.	- Could restore UST sites under UST program rather than CERCLA program.
Air Emissions				
- Air Quality Standards	NMAQCR	NMED/APCB	- TNMHCs < 0.19 ppm for 3-hour average. - Any regulated contaminant <10 tons/year.	
- Construction or operation of a stationary or portable source (e.g. vapor extraction system, air stripper, storage tanks, etc.).	NMAQCR Section 702 and 703	NMED/APCB	- Requires air permitting and registration with the State for emissions from vapor treatment systems with the potential to to emit sources >10 lbs/hr or 25 tons/year, and/or a potential to emit any regulated contaminant <10 tons/year.	- The need for air permitting is significant since it can substantially slow down the implementation of a remedial action (30 to 360 days review and public comment process).
- Emission sources of contaminants associated with remedial treatment systems.	CAA Title I	NMED/APCB	- Establishes NAAQ for individual areas.	- Holloman AFB is located within a "clean air zone" so the PSD program will apply at the base.
	PSD	NMED/APCB	- Regions which meet the NAAQs may fall within the PSD program which is intended to maintain "clear air zones".	
	HAP	NMED/APCB	- HAP is a federal program that applies emission standards and requires permitting for listed chemical compounds, individual compounds >10 tons/year, combination of compounds >25 tons/year.	- Permitting trailer/skid-mounted units as portable stationary sources per NMAQCR Parts 700/702 may decrease the total number of permits necessary on base, permit fees, and permitting burden. Units could be moved from site to site as remediation progresses without reapplying for new permits.

TABLE 2-1 (Cont.)

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Air Emissions (Cont.)	Title V operating permits	NMED/APCB (issuing permits) USEPA (notification and revisions)	- Federal Law requiring operating permits that will apply to almost all air pollution sources. - While other state and federal provisions requires permits (new source, PSD, other), Title V requires that all former permitting requirements be brought into one comprehensive document.	- Implementation of this program will affect the permitting progress for several of the proposed restoration activities at Holloman AFB. Since the program is new, preparing a permit strategy and maintaining regular communication with the NMED/APCB while the operating permit program develops is recommended.
Hazardous Waste - Generator, storage, treatment, and disposal	HWMR Section 6	NMED/HRMB	- State program incorporates majority of RCRA subtitle C. - State of New Mexico is a RCRA-authorized state with exception for the HSWA portion.	- Part B permit for Holloman is granted and regulated by the HWMR. - RCRA Corrective Action allows for use of interim measures to expedite remedial activities.
- Generator, storage, treatment, and disposal	RCRA-HSWA 40 CFR Part 264 Subpart C	USEPA Region VI	- This statute is designed to provide "craddle to-grave" control of waste by imposing management requirements on generators and transporters of waste and owners of TSD facilities.	
- Generator, storage, treatment, and disposal	RCRA-HSWA 40 CFR Part 264 Corrective Action Program Part 264 Section 3004	USEPA Region VI	- Requires TSD owners/operators to take corrective action for all releases from from SWMUs regardless of when the waste was placed in the unit or whether the unit is currently active. - SWMUs can include tanks, lagoons, waste piles, or other types of units.	
- Generator, storage, treatment, and disposal	RCRA-HSWA 40 CFR Subpart S	USEPA Region VI	- Provides provisions for "voluntary" cleanup, phased RCRA facility investigations, range of cleanup levels for site-specific circumstances, and "conditional remedies".	- While this section provides mechanisms for accelerated cleanups, Holloman AFB has experienced resistance from EPA Region VI from applying the rule. - Continued communication with EPA Region VI and NMED regarding the provision in this rule at Holloman AFB should be pursued.

TABLE 2-1 (Cont.)

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Hazardous Waste (Cont.)				
- Corrective Action Management Units and Treatment Units	RCRA - HSWA 40 CFR Subpart S	USEPA Region VI	- CAMU and TU are designed to reduce administrative delays and encourage use of innovative remedial technologies by allowing movement of remedial waste without triggering land disposal restrictions and minimum technology requirements (e.g., double liners and leachate collection systems).	- While implementation of this process has not been aggressively been pursued at this time, as EPA Region VI develops the implementation standards, this method should be considered by Holloman AFB to reduce the total cost of the projects. - Requires formal Part B permit modification which may limit timeliness of response action.
- Investigation/Remediation of Waste Sites	CERCLA/NCP Plan 40 CFR300	USEPA Region VI NMED/GWPRB (DERA-IRP)	- Establishes protocol for assessment, selection of remedy and remedial actions.	- IRP sites follow CERCLA/NCP process. - Can use non-time critical removal actions and engineering evaluation and cost analysis (EECA) approach. - At sites where IRP/SWMU overlap occurs between CERCLA/RCRA both programs must be satisfied.
Solid Waste				
- Solid Waste Management and Disposal	NMEIB/SWMR-4 (8/94)	NMED/SWB	- Establishes operating standards, financial responsibility requirements, and closure standards for landfills. - This regulation brings the State in compliance with RCRA subtitle D requirements.	- Applies to Holloman AFB environmental restoration activities in regards to off-site disposal of the non-hazardous waste generated (e.g., petroleum-contaminated soils, construction, and demolition debris, etc.).
- Landfill Requirements	SWMR (August 1994)	NMED/SWB	- Sections with pertinent changes to active landfills include: permit application requirements, registration of sitings in wetlands or flood plains, methane monitoring program, groundwater monitoring requirements, etc. - Standards for remediation are less stringent (remediation required when dissolved concentrations reach corrective action levels) but more parameters need to be monitored on a regular schedule. - Recently adopted landfill requirements: bring the state program in line with federal program	- Holloman AFB has an existing operating landfill which will need to abide by these regulations. - While the regulations specifies requirements for daily cover, waivers can be obtained for landfills that generate less than 20 tons/day. - Holloman AFB also contains several formerly used landfills which may require closure to be in compliance with the former or existing standards.

TABLE 2-1 (Cont.)

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Solid Waste (Cont.) - Landfill Requirements	RCRA Subtitle D Sect. 7003	USEPA Region VI	- EPA uses this regulation to prove that waste generated during investigation and implementation associated with remedial actions is not hazardous.	
DoD Guidance Documents - Yearly Program Guidance	Yearly Extension Policy (4/14/94)	DUSD/ES	- This policy establishes management prioritization and funding of the DoD's restoration programs. - It also sets forth performance measures that are used in monitoring the progress of the restoration program.	- Specific priorities as they apply to Holloman AFB are examined in Chapter 1 of the Execution Plan.
- Remedial Restoration Program Guidance	ACCRPM Guide	Air Force ACCRPM	- This document was developed for beginning RPMs as a primer in project management and as a reference document for experienced RPMs. - The book is based on successful restoration experiences and provides the basic outline for project execution within Air Force restoration management system.	
Emergency Planning and Community Right-to-Know	- RCRA 1986: includes 40 CFR 302, 40 CFR 370, Section 313, 40 CFR 304, 40 CFR 355 (Append. A & B) - Title III of Superfund Amendments includes EO-12856	SERC LEPC	- Four major elements of EPCRA include 1) Community Emergency Planning (Section 302-303), 2) Emergency notifications; 3) Hazardous chemical reporting, and 4) Toxic chemical release inventory (TRI) reporting. - DoD prepared a guidance document called "DoD Guidance for Implementation of EO 12856 of August 3, 1993". - EPA prepared a guidance document called "EPA Interim Guidance for Implementing EO 12856".	- Storage or release of threshold quantities of certain chemicals during remedial actions may require inclusion of feasibility studies in the Base's yearly Title 313 Report. - Remedial designs should include analysis of potential EPCRA compliance issues. - The guidance document should be referenced for the listed deliverables and associated due dates, due in 1994 and 1995.

TABLE 2-1 (Cont.)

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Pollution Prevention	EO-12856 Section 313	SERC LEPC	- States that by 1999 total releases and off-site transfers of identified toxic chemicals must be reduced 50% at a particular facility and/or agency-wide (DoD facilities) reduction of 50% must be reached. - Each facility that exceeds any EPCRA threshold needs to prepare a PPP	- Remediation releases (e.g., air releases during bioremediation of contaminated soil) of toxic chemicals are reportable under Section 313 - Depending on Holloman AFB's schedule of remedial activities, this aspect of PPA could have a significant impact on the Base's ability to meet the 50% reduction goal - Draft PPPs for DoD review are due 6/1/95 and Final PPPs are due 12/15/95
Proposed State Regulations - Abatement of Water Pollution	NMWQCC 3-200 Series	NMED/GWPRB	- Section 3-203A establishes standards for the vadose zone (soil), vapor, and LNAPL. - Sections 3-203F and 3-203G establish criteria for proposing that a standard is technically infeasible and allow the responsible party to petition alternative abatement standards.	- These new regulations are ARAR for restoration at the Base. Adoption of the proposed regulations may facilitate the use of risk-based standards in the context of future land use and the cost-benefit of attempting to obtain non-achievable standards, or achieving these standards with little or no additional benefit. - May allow adoption of alternative TPH standard for soil cleanup.
Proposed Federal Regulations - Superfund	CERCLA	USEPA Region VI	- Both the House of Representatives (HR 3800) and the Senate (S 1834) are preparing bills for reform of the existing regulations. - Pending measures include: elimination of pre-1987 cleanup liability, retroactive tax insurance premiums if PRPs would agree not to sue their issures, allow groundwater cleanup standards to be met only at site borders (rather than throughout site), and expand EPA's cost recovery authority to to pollutants and contaminants. - Most of the proposed changes are aimed at streamlining the remediation process and reducing the cost of cleanup.	- When, how, and if these reforms are enacted will take a lot of time and require regulatory development prior to implementation.

TABLE 2-1 (Cont.)

SUMMARY OF REGULATORY REQUIREMENTS

MEDIA/ACTIVITY	REGULATORY CITATION	ENFORCING AGENCY	SUMMARY OF REGULATION	APPLICABILITY TO HOLLOMAN AFB ACP
Proposed Federal Regulations (Cont.) - Air Emissions	EPA Draft Rule	USEPA Region VI	- Would regulate organic air emissions from hazardous waste storage active tanks, containers, and surface impoundments (excludes: waste piles, landfills, and land treatment units). - Purpose of the regulation is to control toxic and ozone precursors that are not addressed by CAA HAP requirements. - Rule would apply to owners and operators of permitted interim status facilities and generators who store waste for greater than 90 days.	- Emission reductions of up to 95% are expected where the waste contains organics >100 ppm. - Emission control equipment expected to be employed includes covers and closed-vent systems connected to control devices.
Base Specific Agreements - Base wide clean up levels	NMED letter dated 1/25/93	NMED/WWM		- Basewide soil cleanup standard for TPH <1,000 ppm, providing no RCRA hazardous constituents are involved. - Site groundwater cleanup standards were superseded and groundwater restoration is not required unless a human or ecological receptor is exposed, but no additional containment must take place.
- Federal Facilities Compliance Agreement (FFCA) (1988)		Signed between USEPA Region VI, State of New Mexico, & Holloman AFB	- Establishes closure requirements for sewage lagoons	- Restoration activities at sewage lagoons must be conducted in accordance with the FFCA.
Defense State Memorandum of Agreement (DSMOA) - DOD Funding for state oversight	DSMOA	DoD Deputy under Secretary of Defense	- Agreement establishes the DoD to set up a fund to reimburse NMED for state review of environmental permits, reports, and plans associated with DoD installation environmental restoration programs.	- DSMOA funds NMED regulators to review and approve IRP program activities.

TABLE 2-1 (Cont.)

SUMMARY OF REGULATORY REQUIREMENTS

STATE ABBREVIATIONS:

NMWQCC - New Mexico Water Quality Control Commission
NMEIB/USTR - New Mexico Environmental Improvement Board/ Underground Storage Tank Regulations
NMAQCR - New Mexico Air Quality Control Regulations
HWMR - New Mexico Hazardous Waste Management Regulations
SWMR - New Mexico Solid Waste Management Regulations
NMED/GWPRB - New Mexico Environment Department Groundwater Protection and Remediation Bureau
NMED/USTB - New Mexico Environmental Department/UST Bureau
NMED/APCB - New Mexico Environmental Department/Air Pollution Control Bureau
NMED/SWQB - New Mexico Environmental Department/Surface Water Quality Bureau
NMED/HRMB - New Mexico Environmental Department/Hazardous and Radioactive Materials Bureau
NMED/SWB - New Mexico Environmental Department/Solid Waste Bureau
NMED/WWMD - New Mexico Environmental Department/Water and Waste Management Division
NMSEO - New Mexico State Engineer's Office
BAT - Best Available Technologies
ARAR - Applicable and/or Relevant and Appropriate Requirements

GENERAL ABBREVIATIONS:

TDS - Total Dissolved Solids
mg/l - milligrams per liter
ppm - parts per million
TNMHC - Total Non Methane Petroleum Hydrocarbons
LNAPLS - Light Non-Aqueous Phase Liquids

FEDERAL ABBREVIATIONS:

EPA Region VI - Local Regional Office for the Environmental Protection Agency
CWA - Clean Water Act
NPDES - National Pollutant Discharge Elimination System
CFR - Code of Federal Regulations
NOI - Notice of Intent
USACE - United States Army Corps of Engineers
FR - Federal Register
CAA - Clean Air Act
NAAQ - National Standards for Ambient Air Quality
PSD - Prevention of Significant Deterioration
HAP - Hazardous Air Pollutants Program
RCRA - Resource Conservation and Recovery Act of 1976
HSWA - Hazardous and Solid Waste Amendments of 1984
TSD - Treatment, Storage, and Disposal
CERCLA (Superfund) - Comprehensive Environmental Response, Compensation, and Liability Act of 1980
NCP - National Contingency Plan
SWMU - Solid Waste Management Unit
CAMU - Corrective Action Management Units
TU - Temporary Units
DoD - Department of Defense
DERA-IRP - Defense Environmental Restoration Account-Instllation Restoration Program
DUSD/ES - Deputy Under Secretary of Defense of Environmental Study
ACCRPM - Air Combat Command Installation Restoration Program Remedial Project Manager
EO - Executive Order
EPCRA - Emergency Planning and Community Right-to-Know
SERC - State Emergency Response Commissions
LEPC - Local Emergency Planning Committees
PPA - Pollution Prevention Act
PPP - Pollution Prevention Plan
PRP - Partially Responsible Party

3.0 RESTORATION INITIATIVES

This chapter examines restoration initiatives and tools that can help in accelerating the base's restoration program. These initiatives include: Total Environmental Restoration Contract (TERC), Rational National Standards Initiative (RNSI), the Superfund Accelerated Cleanup Model (SACM), Corrective Action Management Units (CAMU), Pilot Studies, Economies of Scale Project Packaging (ESPP), Real Time Decision Making and the Observational Method, and Restoration Advisory Boards.

3.1 TOTAL ENVIRONMENTAL RESTORATION CONTRACT

The TERC concept was developed by the USACE, Omaha District to support the ACP concept by providing an innovative contracting mechanism by which one contractor is able to provide "cradle to grave, fence to fence" environmental restoration. The TERC was also developed to save time and money by reducing the number of contracting actions between phases of work. The TERC has served to eliminate coordination problems between phases of the work, particularly coordinating one contractor's investigation work with another contractor's design/construction work on the same project. The TERC focuses upon accountability throughout program execution by having one contractor responsible for all phases of a job.

3.2 RATIONAL NATIONAL STANDARDS INITIATIVE

The Rational National Standards Initiative (RNSI), an ACC-wide program, is specifically designed to establish realistic, risk-based, site restoration "targets" such as cleanup levels. By utilizing RNSI targets it is possible to develop remedial action (RA) cost estimates for each of four potential land uses at Holloman AFB sites: commercial, industrial, open land, and residential. The most probable clean-up "target" is based on the site's anticipated or predicted future land use.

While it has not yet been implemented on a systematic basis at Holloman AFB, RNSI principles have been utilized in past risk assessments and accepted by the regulatory agencies for use at Holloman AFB sites. Regulatory agency approval of a RNSI program at Holloman AFB will enable the base to consistently establish screening cleanup levels for each site under each of the four land use scenarios.. Decision-making would be streamlined after RNSI cleanup levels are applied to sites that require risk evaluations. Sites that have existing contamination less than RNSI targets can potentially be recommended for no further action. Contrarily, if contaminant levels are higher than the screening cleanup levels, the RNSI-derived cleanup levels could serve as the initial removal goals for a presumptive remedy effectiveness evaluation.

RNSI also fosters risk management at the base because it gives decision makers the ability to calculate and evaluate the costs and benefits associated with different end uses of the site if and when land use changes. Coordination of cleanup and the Base Comprehensive Plan as it relates to land use is a major step in establishing effective cleanup objectives.

3.3 SUPERFUND ACCELERATED CLEANUP MODEL

The EPA's Superfund Accelerated Cleanup Model (SACM) promotes using the rapid reduction of risk at sites posing the greatest threat to human health and the environment through use of early actions. SACM was initiated to streamline and accelerate the remedy selection and site cleanup process to facilitate early "risk reduction." Key aspects of SACM include implementation of early actions and the use of presumptive remedies.

3.3.1 Early Actions

Within the SACM framework, early actions represent environmental restoration activities with the primary goal of rapidly reducing risk. There are several benefits gained from implementing early actions:

- Source Reduction - By removing the primary mass of contaminants (LNAPLs, saturated soils, or the residual contamination at former waste management units), source reduction effectively minimizes short-term risks and prevents a manageable problem from becoming formidable. Protection of human health and the environment is a direct benefit obtained from the reduction of contaminant sources.

- Real Time Data - Operation of an early action remediation system can provide valuable data necessary to fine-tune the design of a full-scale final remediation system, if one is deemed necessary.

- Containment - Containment applies to surface and subsurface environmental problems. Early capping actions reduce immediate risks posed by contaminants in landfills and burial pits and provides the added benefit of reducing leachate generation. Prevention of dissolved-phase or free product plume migration can reduce the ultimate time and cost to closure by limiting the areal extent of contamination.

- Intelligent Selection of Technology - In many cases, early actions can be implemented with limited technology screening. Knowledge of waste characteristics, site geology, and other factors can lead to the selection of an appropriate remedial technology immediately following confirmation of contaminant concentrations in excess of applicable remediation standards. This concept is explained in greater detail in Section 3.3.2, which describes the use of presumptive remedies.

- Expedited Time and Reduced Cost to Closure - Early action commences upon recognition of the nature, but not necessarily the total extent of contaminant concentrations in excess of applicable remediation goals. This expedites site closure by immediately initiating a remedy early in the life of the project. Additional investigative work may still be necessary to completely define the nature and extent of contamination; however, this work can be performed concurrently with the early action. In many cases, a full-scale corrective measures/feasibility study may ultimately not be necessary if the early action remedy produces results beyond initial expectations. If expansion of an early action remediation system is necessary, design and construction can be initiated much earlier in the overall program.

Early actions can be implemented as either removal actions or remedial actions. The basis for determining if removal or remedial action is appropriate for a particular area of concern is largely dependent upon an evaluation of site-specific restorations goals as they relate to the programmatic goals for cleanup at the base.

3.3.1.1 Non-Time-Critical Removal Actions

EPA has indicated that non-time-critical removal actions should be used extensively to accomplish SACM goals. Non-time-critical removal actions can be utilized to reduce risk when planning phases for restoration activities exceed six months. Removal action planning is not preferred for long-term complex activities such as ecosystem restoration (wetlands, surface water bodies, etc.) or large groundwater restoration projects. Remedial action planning is utilized in these instances.

Non-time-critical removal actions include an analysis of alternatives in an engineering evaluation/cost analysis (EE/CA). The SACM approach allows for the preparation of base-wide removal action plans to satisfy EE/CA requirements. A base-wide removal action plan supports the use of a particular remedial approach by structuring the technical and regulatory decision-making process as it relates to an area of concern:

- Criteria for technology application are specified to facilitate rapid evaluation during the planning phase for a given area of concern

- A removal action implementation decision tree and responsibility matrix are formalized to establish procedures and scheduling mechanisms for:

    - Review of submittals
    - Notification of planned activities
    - Agency/public commenting
    - Issuance of Action Memoranda

After a Base-wide removal action plan is approved and a technology can be applied, site-specific removal action plans are prepared in accordance with established procedures considering technology-specific criteria. To satisfy EE/CA requirements, conceptual designs and cost estimates for removal actions are developed. Regulatory concurrence with a site-specific removal action plan is provided within an Action Memorandum, which binds all affected parties to implementing removal action activities, including design, construction, monitoring, and close-out, within a stipulated schedule.

Recognizing that critical technical issues are addressed during the base-wide removal action planning process, SACM allows for concurrent regulatory reviews of plans and design submittals as design/construction phases of work proceed. By recognizing the benefits obtained from technically sound front-end planning, the requirement for in-depth regulatory review by the entire team is minimized and work proceeds unhindered even during review cycles. Significant gains in efficiency are realized and the intent of SACM is put into action.

3.3.1.2 Interim Remedial Actions

Interim Remedial Actions (IRAs) are generally intended to address short-term threats while permanent remedial solutions are being developed. They can be implemented at any point during the remedial investigation/feasibility study (RI/FS) process. IRAs differ from non-time-critical removal actions in the flexibility they afford planners. Within the context of SACM, non-time-critical removal actions are approached programatically by evaluating technologies on a site-specific basis after developing the criteria for their application base-wide. Removal actions are viewed as a means of obtaining closure at specific areas of concern on a systematic basis. IRAs are reserved for addressing threats that must be mitigated under tight schedule constraints to increase the manageability of growing problems. An IRA could be used contain a migrating plume in an area of concern where a removal action is planned for source control and a permanent remedial action is planned for groundwater restoration. The use of focused IRAs within the framework of programmatic removal actions gives planners the needed tools to achieve early reduction of risks and accelerated cleanup at areas of concern as site conditions and applicable technologies deem appropriate.

3.3.2 <u>Presumptive Remedies</u>

Presumptive remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. EPA has evaluated technologies that have been consistently selected at past sites using the remedy selection criteria set out in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). They have reviewed performance data and determined that certain remedies are presumptively the most appropriate for addressing specific types of sites.

The use of presumptive remedies allows the remedy selection process to be accelerated. In particular, the technology identification and screening steps in an FS or EE/CA can be directly eliminated by going directly to the detailed analysis of technology options. Presumptive remedies are predicated on the process of technology screening. There are many potentially applicable technologies for addressing site contamination. The effectiveness of these technologies is dependent on contaminant and site characteristics, regulatory requirements, closure criteria, and cost limitations. To design, construct, and operate the most cost-effective and applicable restoration technologies to achieve site closure, it is necessary to screen out inappropriate or costly restoration options. The following information is needed to select appropriate technologies:

- Applicability of Technology to Site Contaminants - Contaminant properties can often provide an indication regarding applicability.

- Site Characteristics - The applicability of treatment technologies is highly dependent on site characteristics such as soil lithology, depth to groundwater, vertical and horizontal transmissivity in the saturated and unsaturated zone, soil and groundwater chemistry, and surface improvements (roadways, utilities, buildings, runways, etc.).

- Regulatory Acceptance of Technology and Required Permits - Regulatory acceptance is necessary for the implementation of a selected remediation technology. The necessity for various permits, and the ability or inability to procure those permits, can make the implementation of a technically feasible technology impossible.

- Treatment Time Objectives - The length of time to achieve desired restoration goals is a critical factor in the technology screening process. Reducing treatment times to accommodate a particular technology may increase the total cost to closure.

- Project Life-Cycle Costs: Project life-cycle costs consist of all expenses that are incurred for site assessment and restoration over a project's lifetime. These costs include site investigation, site engineering design, capital costs, operation and maintenance requirements, monitoring, and project management. The restoration system having the lowest possible present worth cost, which achieves project objectives in terms of both closure goals and treatment time, should be selected. Obviously, capital costs must be carefully weighed against the estimated treatment time required to achieve closure. Administrative and potential litigation costs should also be considered in selecting the restoration strategy.

Administratively, the selection of a presumptive remedy is facilitated by reviewing Records of Decision (RODs) issued for sites similar to those being considered for remediation at the base. A search of RODs provides regulatory agencies with the precedented use of a particular technology for remediation of similar contaminants under similar conditions. Documenting the results of the ROD search within an administrative record eliminates timely preparation of a ROD for each site at the base and allows regulators to focus upon technical issues associated with implementing a particular technology.

3.4 CORRECTIVE ACTION MANAGEMENT UNITS/TEMPORARY UNITS

The recently promulgated Corrective Action Management Unit/Treatment Unit (CAMU/TU) Final Rule has significant implications to the management of wastes generated during remedial/corrective actions. These "remediation wastes", when placed in CAMUs or TUs, are exempt from many of the RCRA regulations and standards, including land disposal restrictions (LDRs) and minimum technology requirements (MTRs) that normally apply to the treatment, storage, and disposal of hazardous solid wastes. The use of these special units during remedial/corrective actions will facilitate common-sense remedial decisions, leading to expedited cleanups and cost savings for an area of concern undergoing remedial action. The use of CAMUs would have to be evaluated carefully due to the permitting and monitoring requirements associated with these units.

3.5 PILOT STUDIES

Pilot studies are utilized to establish technical feasibility of established and innovative remedial technologies and obtain necessary design information for development of full-scale remedial design. At some sites, pilot studies can be utilized to completely address contamination which is limited in nature and extent (e.g. limited POL contamination in soil). Under various programs, pilot studies have been performed previously or are planned at the Base.

Pilot studies are useful at sites for which a "presumptive remedy" has been selected to account for site-specific factors such as heterogeneity in subsurface soil and groundwater conditions. In many cases, economies of scale can be realized by expanding pilot projects to full-scale remedial action using the equipment mobilized for the pilot testing phase, by expanding the area of influence, time of operation, or location of mobile skid-mounted equipment. Pilot studies can also target residual source areas for immediate abatement of contamination.

3.6 ECONOMIES OF SCALE PROJECT PACKAGING (ESPP)

The concept of ESPP is to group projects of similar work into packages for execution. When similar work is grouped together savings in work time and overall costs can be achieved. This is especially true for field work where one subcontractor can be hired to do the drilling, sampling, or any other field effort for several separate projects. The cost is reduced by providing one subcontractor a larger scale of work and time is saved by avoiding several mobilization/demobilization events. In addition, it encourages all team members to develop and stick to a much tighter performance schedule. ESPP can also be applied to the design and construction portion of a project to achieve time and costs savings through the same rationale applied to the field work.

3.7 REAL TIME DECISION MAKING AND THE OBSERVATIONAL METHOD

The concept of "Real Time Decision Making" involves empowering the project team at the working level to make substantial decisions in the field that directly affect the work at hand. Real time decision making is made possible through the use of flexible work plans and designs which incorporate a decision-making framework. The decision making framework is referred to as the Observational Method.

The Observation Method relies upon approaching problems with an acceptable level of uncertainty. The ability to account for the uncertainty and to modify activities as predictable events occur in the field facilitate reduced sampling/analysis, design, and construction costs. The general approach to utilizing the Observational Method is:

- Gather existing information on general site conditions and set remedial goals and general responses
- Gather information and refine knowledge of general site conditions and nature and extent of contaminants
- Establish the most probable site conditions and reasonable deviations that could be encountered in the field during remediation

- Design the remedial action based on the most probable conditions and prepare contingency plans to account for anticipated reasonable deviations

- Select measurable quantities to observe during remediation to detect deviations during construction and operation

- In advance, select a course of action or design modification for each reasonable deviation

- Implement the remedial alternative measuring the selected parameters and instituting the contingency plans and design modifications as deviations occur

With an acceptable level of uncertainty it is possible to implement remedial actions that use real-time measurements to increase the level of certainty while addressing the problem actively. The Observational Method satisfies regulatory requirements because nature and extent are characterized during and after the implementation of remedial activities. The flexibility of this approach helps to accelerate site restoration, achieves regulatory requirements by design, and reduces overall costs with value added throughout the process.

3.8 RESTORATION ADVISORY BOARD (RAB)

The RAB was established by DUSD/ES to provide the local community access to the restoration decision making process. The purpose of the RAB is to:

- Act as a forum for discussion and exchange of information between agencies and the community

- Provide an opportunity for stakeholders to review progress and participate in dialogue with the decision makers

The RAB is comprised of DoD constituents, EPA and/or state representatives, and members of the local community. DoD ensures the members reflect diverse interest within the community. DoD has developed a coordinated, open process for nominating and selecting RAB members. This process is a cooperative effort with regulators and affected community members. The RAB is jointly chaired by the DoD constituents and a community representative. The community co-chair is selected by community members of the RAB.

4.0 IMPLEMENTATION OF STRATEGIC INITIATIVES

The implementation of the strategic initiatives and tools described in Section 3.0 is addressed in this section. Key aspects associated with the strategic plan include identification of presumptive remedies, development of an execution plan, initiating the execution plan on a trial basis for selected sites, and documenting proposed approaches as well as program results.

Presumptive remedies must be identified with candidate sites selected for future removal action implementation. Planning for future removal actions involves packaging of sites into workable groups as well as prioritization of sites to comply with RCRA permit requirements. Implementation of the execution plan on a trial basis at selected sites precedes full-scale program execution, providing opportunities for real-time evaluation of the program. Formalization of the execution plan and establishment of program goals facilitates team commitment to results and provides a basis for evaluating progress.

4.1 OVERVIEW OF PRESUMPTIVE REMEDIES

A fundamental component of the Strategic Plan is the use of presumptive remedies to achieve SACM objectives. To date, EPA has selected presumptive remedies for only a few types of sites. The types of sites most applicable to the Holloman AFB Strategic Plan are sites with volatile organic compounds (VOCs) in soils and municipal landfills. In order for Holloman AFB to use other presumptive remedies, EPA and NMED must concur on the remedy. To this end, the USAF is currently establishing patterns for remedy selection at bases across the country. Their efforts focus upon showing that particular technologies have been implemented successfully numerous times at similar sites. The use of performance data from technology implementation provides the basis for documenting success and soliciting concurrence from EPA and state regulatory agencies. As concurrence is obtained, an administrative record is created to document that a remedy works, is superior to other remedies under similar situations, and can be utilized presumptively at sites. The use of presumptive remedies is established by individual bases recognizing that permit and other EPA/state mandates must be satisfied.

The remainder of this section presents brief process descriptions of the applicable EPA presumptive remedies, ACC's innovative technologies, and descriptions of other remedies likely to be applicable to Holloman AFB sites. Because the only applicable groundwater restoration standard for the base applies to removal of free floating product, remedies considered focus on soil restoration to comply with the base-wide total petroleum hydrocarbon (TPH) standard for petroleum/oil/lubricant (POL) sites, removal of light non-aqueous phase liquids (LNAPL), reduction of risk with respect to occupational exposure, current and future land use scenarios, and stabilization of residual sources to prevent possible future releases to groundwater or surface water bodies.

4.1.1 Applicable Technologies

4.1.1.1 Presumptive Remedy for Contaminated Soils: Soil Vapor Extraction

EPA has selected three remedies for VOCs in soil: soil vapor extraction (SVE), thermal desorption, and incineration. SVE is the primary focus and is anticipated to be the most likely remedy at similar sites Holloman AFB.

SVE is generally an in situ process that physically removes contaminants from vadose zone soils. It can also be performed ex situ in biopile remediation systems. Vacuum is applied through extraction wells to create a pressure gradient that induces air flow through the soil matrix. The flowing air strips VOCs from the soil and carries them to extraction wells. Off-gas treatment may be required. Performance data have indicated that SVE effectively treats waste in place at a relatively low cost. It is appropriate for substances with relatively high vapor pressures, such as gasoline and solvents, but will not effectively remediate soils contaminated with low volatility substances such as oils or jet fuel. SVE is less effective in soils with low permeability, high moisture content, or high organic content.

4.1.1.2 Presumptive Remedy for Contaminated Soils: Municipal Landfill Containment

EPA has selected containment for municipal landfills as a presumptive remedy. This could include capping, source area groundwater control, leachate collection and treatment, and landfill gas collection and treatment. Institutional controls such as fencing/access controls are also included. Some landfills at Holloman AFB could be considered similar to municipal landfills because of the wastes that were disposed of historically. Capping is a potential technology that may be used at many of these landfills.

Subtitle D closure requirements will be used generally to govern response actions at municipal-type landfills. The final cap may consist of a variety of protective layers, including a vegetated soil layer, a drainage layer, a geomembrane liner, compacted clay, and a gas vent layer. RCRA Subtitle C closure requirements may be applicable if hazardous wastes are present in the landfill. A Subtitle C cap can be designed in a variety of ways, but a typical design would consist of vegetated soil layer, filter fabric, drainage layer, geomembrane liner, compacted clay or geosynthetic clay liner, and a gas vent layer, as appropriate.

Leachate collection, groundwater control, and gas venting/control are incorporated into presumptive remedies on a site-specific basis.

4.1.1.3 Presumptive Remedy for Contaminated Soils: Bioventing

Bioventing is a technology that has been demonstrated successfully at many USAF sites. It has been demonstrated to be an effective technology for treating non-halogenated volatile and semivolatile organic compounds, including jet fuel.

Bioventing involves delivering oxygen to contaminated vadose zone soils by forced air movement. Air is generally injected into the contaminated zone to stimulate aerobic, biological decomposition of contaminants. Air can also be induced into the contaminated soils by installing extraction wells around the area of contamination.

USAF has developed a technical protocol for field treatability testing of bioventing systems. This was developed for Air Force Center of Environmental Excellence (AFCEE) in its "Test Plan and Technical Protocol for a Field Treatability Test for Bioventing" (Miller et al., AFCEE, January 1992). The protocol was developed with EPA support based on research and USAF experience in installing and operating systems at numerous sites.

4.1.1.4 Presumptive Remedy for Contaminated Soils: Landfarming

Landfarming has been used in the petroleum refining industry as an effective means of treating waste petroleum sludges. It has been used at some ACC installations for treating POL-contaminated soils resulting from leaking underground storage tanks (USTs).

Landfarming involves spreading organic wastes over an area of land and periodically tilling the waste and soil to aerate the waste. Natural soil microorganisms (bacteria, fungi) degrade the organic compounds. Nutrient addition, pH control, and moisture control are sometimes incorporated to optimize the biological activity.

4.1.1.5 Presumptive Remedy for Contaminated Soils: Composting

Composting is an aboveground soil treatment technique that has proven to be cost-effective for soil treatment at federal facilities. It can be effective on most POL-contaminated soils.

Amended soil containing organic wastes is placed in large static piles or windrows and aerated to enhance microbial degradation and volatilization. Aeration can be either through vacuum extraction or air injection for a static pile or frequent turning for windrows. Soils and/or sludges are normally amended with a bulking agent (e.g., wood chips) to increase porosity and facilitate gas exchange and mixing. Other organic amendments (e.g., manure), nutrients, and microbial inocula are often added to accelerate and optimize the process. Moisture and temperature must be monitored and controlled. Composting is advantageous to landfarming when space limitations are a factor.

4.1.1.6 Presumptive Remedy for Contaminated Groundwater: Pump and Treat

There will be a variety of preferred treatment technologies. Hydraulic containment of plumes rather than total groundwater cleanup will be the focus of this remedy at Holloman AFB because the underlying aquifer is not a suitable potable water source.

4.1.1.7 Presumptive Remedy for Groundwater: Air Sparging

This is a relatively new technology for groundwater remediation that is somewhat analogous to bioventing in soils. It has been tested on USAF installations and can be appropriate for VOCs and some semivolatile compounds under the proper hydrogeologic conditions. It can be both a physical process (in situ air stripping) and a biological process. The latter is sometimes called bio-sparging.

Air is injected into wells in the saturated zone. For stripping, injection wells are installed in a row near the downgradient edge of a VOC plume and air is injected at a high rate to strip the VOCs out of the groundwater and into the vadose zone. The vapors either migrate to the surface or are biodegraded in place. It is sometimes combined with SVE. For bio-sparging, wells are installed within the plume and air is injected at a low rate so that the dissolved oxygen content of the groundwater is increased without stripping significant quantities of VOCs. Aerobic microbial activity in the groundwater degrades both VOCs and semivolatile compounds.

4.1.1.8 Protocols for Innovative Technologies

ACC is pursuing an initiative to develop innovative remediation technologies in conjunction with AFCEE. The purpose is to reduce the overall cost of site restoration, particularly through alternative solutions to expensive, inefficient pump and treat systems.

Protocols are being developed for two technologies: intrinsic remediation (natural attenuation) and bioslurping. The Technical Protocol for data collection and modeling in support of intrinsic remediation for dissolved-phase fuel contamination in groundwater has been developed by AFCEE in cooperation with EPA. Also, a field test and evaluation of a bioslurping pilot system is being developed. Bioslurping is a vacuum-assisted LNAPL free product recovery and bioremediation technology. It combines vacuum extraction to physically remove LNAPL with bioventing to enhance biodegradation of residual contaminants.

4.1.2 <u>Site-Specific Assessment of Presumptive Remedies</u>

Table 4-1 summaries potential presumptive remedies for sites at Holloman AFB that may require remedial action. The presumptive remedies suggested are either based on known site conditions or site conditions anticipated at sites where no investigation has been implemented.

Some sites are candidates for use of more than one presumptive remedy. During base-wide removal action planning, site selection criteria will be established. These criteria will be applied to individual sites during the preparation of site-specific removal action plans to determine the most applicable remedy for a given site.

Table 4-1

Potential Presumptive Remedies for Holloman Air Force Base Sites

IRP		Soil Contaminants		Groundwater Sources		Soil Presumptive Remedies					Groundwater Presumptive Remedies		
Site ID #	HSWA SWMU No.	Primary	Secondary	LNAPL	DNAPL	SVE	Containment	Biovent	Landfarm	Composting	Bioslurping	Pump/Treat	Air Sparging
LF-01	106	Landfill					No Further Action						
SS-02	AOC-T	TRPH & BTEX				X							
SS-05	AOC-T	TRPH & BTEX				X							
SS-06	NA	TRPH & BTEX		X		X		X	X	X	X		
SD-08	82	Pesticides and Metals					X						
OT-14	197	Pesticides					X						
OT-11	107	TRPH	PCBs						X	X			
SD-15	NA	Metals					X						
OT-16	132/118/AOC-A	TRPH	PCBs and Pesticides				Recommending No Further Action						
SS-17	NA	TRPH & BTEX		X		X							
OT-24	134	TRPH & BTEX					Recommending No Further Action						
SD-27	NA	TRPH & BTEX						X	X	X			
LF-29	104	Landfill	Ordnance				X						
FT-31	170/171/135/39/127	TRPH & BTEX	Solvents	X	X	X		X	X	X	X		
SS-39	165/177/178	Metals and Solvents					Recommending No Further Action						
OT-43	AOC-G	TRPH	PCBs						X	X			
OT-44	AOC-P	TRPH & BTEX		X		X		X	X	X			
OT-45	NA	TRPH & BTEX		X		X		X	X	X			
WP-49	NA	Pesticides and Metals	PCBs and Sulfide				X						
SS-57	AOC-V	TRPH & BTEX				X							
LF-58	231	Landfill/Unconventional Fuels					X						
SS-59	NA	TRPH & BTEX		X		X		X	X	X	X		
SS-60	NA	TRPH & BTEX		X		X		X	X	X	X		
	Table 2												
	123	TRPH & BTEX						X	X	X			
	36	TRPH & BTEX						X	X	X			
	138	TRPH & BTEX						X	X	X			
	136	TRPH & BTEX						X	X	X			
	129	TRPH & BTEX						X	X	X			
	183	Sewer System		X	X	X		X	X	X	X		
	Table 3												
	3	TRPH & BTEX						X	X	X			
	4	TRPH & BTEX						X	X	X			
	6	TRPH & BTEX						X	X	X			
	10	TRPH & BTEX						X	X	X			
	18	TRPH & BTEX						X	X	X			
	1	TRPH & BTEX						X	X	X			
	5	TRPH & BTEX						X	X	X			
	6	TRPH & BTEX						X	X	X			
	7	TRPH & BTEX						X	X	X			
	8	TRPH & BTEX						X	X	X			
	9	TRPH & BTEX						X	X	X			
	11	TRPH & BTEX						X	X	X			
	12	TRPH & BTEX						X	X	X			
	13	TRPH & BTEX						X	X	X			
	14	TRPH & BTEX						X	X	X			
	16	TRPH & BTEX						X	X	X			
	19	TRPH & BTEX						X	X	X			
	20	TRPH & BTEX						X	X	X			
	23	TRPH & BTEX						X	X	X			
	24	TRPH & BTEX						X	X	X			
	25	TRPH & BTEX						X	X	X			
	26	TRPH & BTEX						X	X	X			
	27	TRPH & BTEX						X	X	X			
	28	TRPH & BTEX						X	X	X			
	29	TRPH & BTEX						X	X	X			
	30	TRPH & BTEX						X	X	X			
	31	TRPH & BTEX						X	X	X			
	33	TRPH & BTEX						X	X	X			
	34	TRPH & BTEX						X	X	X			
	35	TRPH & BTEX						X	X	X			
	37	TRPH & BTEX						X	X	X			
	38	TRPH & BTEX						X	X	X			
	41	TRPH & BTEX						X	X	X			
	229	TRPH & BTEX		X		X		X	X	X	X		
	230	TRPH & BTEX		X		X		X	X	X	X		

4.1.3 Risk Assessment

Traditionally, Holloman AFB has used risk assessment in all stages of the IRP. Although extremely conservative baseline risk assessments have been performed to evaluate residential land use, EPA, NMED, and the base recognize that the assumptions used for this exercise are unrealistic given the remote location of Holloman AFB, the quality of groundwater at the base (non-potable), and the four proposed future land uses at the facility. The baseline assessments are primarily used to fulfill regulatory requirements and to have a point of reference for residential exposure.

This section explores in greater detail the role of risk assessments as they relate to presumptive remedies and the implementation of the strategic plan.

4.1.3.1 Site Cleanup Levels

As stated in Section 3.2, RNSI principles have been utilized in past risk assessments and accepted by the regulatory agencies for use at Holloman AFB sites. Within the context of the strategic plan, Holloman AFB intends to prepare risk assessments at areas of concern systematically as a means of obtaining closure at sites. Site closure will not be achieved until risk-based, technology-based, or NMED-mandated cleanup levels are obtained.

Cleanup levels for contaminants of concern will be developed for selected sites using residential, open space, commercial, and industrial land use models prescribed within the RNSI approach. The most probable future land use cleanup level will applied to each site. Holloman AFB frequently updates the status of future land use at the base; however, the majority of sites at the base have clearly defined future land uses. In instances where future land use cannot be determined, Holloman AFB may select a somewhat conservative risk-based cleanup level to broaden the applicability of a site for future uses.

At sites where RNSI target numbers cannot be achieved technically or cost-effectively, technology-based cleanup targets will be proposed. Holloman AFB will coordinate with EPA and NMED when establishing technology-based cleanup levels. Coordination will commence during the preparation of a base-wide removal action plan for a particular presumptive remedy and continue through site-specific planning until an achievable cleanup level is agreed upon.

Adequate documentation, particularly related to compliance with pending groundwater abatement regulations (NMED Ground Water Protection and Remediation Bureau, June 1994), will be provided to NMED when risk-based cleanup standards that are less stringent than existing base-wide standards are proposed.

4.1.3.2 Streamlined Risk Evaluation

EPA promotes the use of streamlined risk assessments to facilitate presumptive remedy selection and implementation of early actions. When selecting a presumptive remedy, a "risk evaluation that identifies only contaminants of concern in the affected media, contaminant concentrations, and the toxicity associated with the chemical can be sufficient to justify taking an action" (EPA, Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA, August 1993). In the limited situations where base-wide cleanup levels have not been agreed upon with NMED and risk- or technology-based cleanup levels have not yet been developed, Holloman AFB will utilize streamlined risk evaluation as a means of accelerating site cleanup and reduction of risk. The streamlined risk assessment will not serve as a substitute for RNSI- or technology-based cleanup levels; rather, streamlining will allow the strategic program to move forward according to front-end planning and help reduce risks to human health and the environment. Achieving acceptable cleanup levels and obtaining regulatory concurrence will precede site closure for all sites.

4.2 REMOVAL ACTION PLANNING

Removal action planning transforms the current base strategic plan into a working program execution plan. Individual sites are grouped together in packages and evaluated for applicability in light of available presumptive remedies. As sites are packaged, the best means of executing removal actions is formulated considering implementability issues and the relative degree of risk posed by sites. The degree of risk is an important factor that will dictate the order in which sites are addressed because the base RCRA HSWA permit prioritizes the cleanup of high risk sites. Approaching the execution of removal actions in this manner ensures permit compliance and a smooth transition from the traditional means of achieving site closure to the preferred approach embraced by SACM.

4.2.1 Project Packaging

Holloman AFB sites have been conceptually evaluated for candidacy utilizing the presumptive remedies presented in Section 4.1. Prior to the preparation of base-wide removal action plans for each presumptive technology, sites will packaged according to the applicability of the technology to the site after additional evaluation. Sites may be considered candidates for more than one presumptive remedy after this evaluation phase. The final selection of a preferred presumptive technology will occur after the application of technology screening criteria to each site. Screening criteria will be formalized within each base-wide removal action plan.

Packaging will also consider economies of scale when implementing future project activities. Economies of scale are proposed for the following types of work to be performed at the base:

- Grouping of all sites requiring soil vapor surveys/hydropunch/drilling. Where feasible, work will be performed in one mobilization with a single subcontractor.

- Preparing concurrent remedial designs for multiple sites, considering the use of skid-mounted and pre-designed equipment as well as boilerplates for standard drawing and design details.

- Simultaneously performing removal actions at multiple sites to reduce mobilizations and equipment costs while working with a trained labor pool that is familiar with site operations.

- Scheduling long-term monitoring sites such that monitoring of sites is conducted in one mobilization biannually, rather than multiple mobilizations each year.

- Scheduling and performing operation and maintenance of multiple systems in a single mobilization to the base, to reduce the costs of travel, per diem, and equipment rental.

4.2.1.1 Corrective Action Management Units

CAMUs may be utilized if ex situ treatment units are required for multiple sites at the base. The use of CAMUs will be compared with the economics and permitting associated with performing removal actions at each site. If a CAMU is deemed appropriate for an ex situ remedy such as landfarming, candidate sites will be packaged accordingly and presented for consideration within a base-wide removal action plan.

4.2.1.2 Pilot Studies

Pilot studies will provide indications of likely success for the use of presumptive technologies at candidate sites. Pilot study results for SVE and bioventing will be evaluated as part of site packaging for these technologies. The similarities of contaminants at candidate sites for both technologies require field-generated information to discriminate between the potential applicability of the technologies. Additional screening criteria presented in base-wide removal action plans will further assist in the evaluation and selection of the most appropriate remedy for given sites.

4.2.2 Prioritization of Sites

Prioritization of sites is performed concurrently with site packaging. Site prioritization considers the implementability of remedies at the base with particular emphasis on achieving success with proven technologies early in the execution of the program. The relative risk of sites, particularly as risk relates to existing RCRA permit requirements, is also a key factor in the scheduling of removal action activities at sites. Achieving success with proven technology must be balanced with the need to address high risk sites when prioritizing presumptive remedies for sites.

4.2.2.1 Implementability

Presumptive remedies can be designed, installed, operated, and monitored at different sites with varying degrees of difficulty. From an engineering/construction perspective, it is desirable to address sites in order of increasing complexity. The lessons learned from tackling problems encountered at relatively simple sites can be applied to more complex sites with savings in both cost and schedule.

By considering implementability factors at the base, sites will be prioritized to gain familiarity with site-related obstacles without sacrificing the progress of the removal action program. Site complexity factors will be balanced against site risks to determine the most prudent means of prioritizing sites.

4.2.2.2 Degree of Risk

Environmental restoration activities at Holloman AFB have been driven by the RCRA HSWA permit. The permit established the priority that sites received attention according to potential risks. As the focus of the restoration activities shifts from defining nature and extent of contamination to implementation of early actions, the degree of risk posed by sites will be re-evaluated in order to determine the relative risks posed by sites which will ensure compliance with the intent of the RCRA permit.

The prioritization of sites for early action will consider site risks as indicated by recent available data. Depending upon the nature of risks as determined by data evaluation and assessment, it may be necessary to modify previous assumptions regarding the relative risks posed by sites. These modifications will be substantiated by sound technical judgment and will not be recommended as a means of conveniently accelerating the removal action program.

4.3 BASE-WIDE INITIATIVE

The execution of Holloman AFB's base-wide removal action initiative will be accomplished in a phased manner. Initially, pilot projects will be implemented at selected sites to familiarize the project team with operant and administrative issues that will be encountered throughout the life of the removal action program. After the pilot projects are completed and the project team is comfortable with removal action management and administration, full-scale implementation of the base-wide initiative will commence and removal action planning/execution will ensue for all potential presumptive remedies.

4.3.1 Pilot Projects

Pilot projects will be selected to familiarize the project team with the mechanisms of the base-wide initiative. Key issues to be considered when selecting representative projects are the applicability of presumptive technologies to sites at the base, the complexity of implementing the chosen remedy, and the ability to gain experience in the administration of the base-wide initiative without being hindered by technical issues. As the pilot program is executed, it will be evaluated by the project team to streamline the eventual full-scale implementation of the base-wide initiative.

4.3.1.1 Selection of Presumptive Remedies

The success of the base-wide initiative to execute removal actions requires efficient utilization of resources during every phase of every removal action project. As with any new venture, a learning curve must be experienced in order to achieve the most gains from the project team. To this end, it is advantageous to initiate the removal action program with a focus on remedies that are demonstrated as being very effective and are relatively simple to implement. SVE and bioventing are two examples of remedies that satisfy these criteria.

As depicted in Figure 4-1, both SVE and bioventing have potential wide-spread use at Holloman AFB. Both remedies are relatively "low-tech" and can be designed and installed at sites quickly and inexpensively. By placing the initial focus of the removal action program on SVE and bioventing sites, the project team will have an opportunity to proceed along the learning curve and settle programmatic and coordination issues without being hindered by the complexities posed by sites or remedial systems. After the project team becomes comfortable with the mechanisms of executing the base-wide removal action initiative, other remedies will be pursued. If a high risk site must be addressed early in the program and the risks posed by the site cannot be mitigated utilizing either of these "low-tech" approaches, an exception will have to be made in order to comply with permit requirements.

4.3.1.2 Pilot Program Evaluation

As part of scheduled project meetings, project team members will review the progress of the removal action pilot program. Discussions will focus on team members' expectations, coordination issues, regulatory compliance, resource management, and continuous process improvement. Frequent and open communications will serve to identify and resolve concerning issues before they become unmanageable and hinder progress.

4.3.2 Full-Scale Implementation

After site closure is obtained for selected pilot program sites, full-scale implementation of the base-wide removal action initiative will commence. Base-wide removal action plans will be prepared for the gamut of potentially applicable presumptive remedies. Plan preparation will be phased to best utilize project team resources.

The phasing of the full-scale base-wide removal action initiative will consider the status of on-going projects in light of planned work. Removal action plans and designs will be submitted to EPA and NMED in manageable packages to assist the agencies with their efforts in reviewing project deliverables and executing action memoranda. Experience gained from the pilot program will be put into action during full-scale implementation as follows:

- Project team members working on removal action plans will proceed immediately intc detailed design after submittal of plans to EPA and NMED. With expectations established during the pilot program, design activities will be able to proceed and submittals that address agency requirements will be produced.

- Standard designs and equipment packages will be developed during the pilot program with the intent of gaining regulatory concurrence for later efforts. After designs are completed during the full-scale phase of the program, construction procurement will commence and every effort will be made to expedite field implementation. Again, the familiarity gained during the pilot program will build trust between project team members and facilitate a smooth transition between planning, design, and construction phases without hindering progress and maintaining compliance with applicable requirements.

4.4 EXECUTION PLAN

The steps needed to make the transition from the strategic plan to full-scale implementation of the removal action program will be formalized in an execution plan. The plan will address the use of existing and planned contracting mechanisms, regulatory agency concurrence, and community involvement. The methods for evaluating progress throughout the life of the program will be included within the execution plan as well.

4.4.1 Formalization of Strategic Initiatives

Project team concurrence with the execution of the strategic plan is tantamount to the ultimate success of the environmental restoration program at Holloman AFB. To this end, the execution plan will formalize the roles of each active participant in the program and define how the various parties involved with removal action activities will interact with each other. Coordination between the TERC team and the community will be addressed.

4.4.1.1 Use of TERC Resources

Holloman AFB, the USACE, the regulatory agencies, and the TERC contracting team will be the driving force behind the execution of strategic initiatives. Program goals for removal actions will be established for the team. Experience gained towards achieving removal action goals will be applied to improve performance. Performance will be measured periodically to assess overall progress.

The efficient coordination and use of TERC resources will be key factors in the ultimate success of the base-wide initiative. Essential elements of the execution plan related to the TERC team will include:

- Establishing teams to prepare site-specific removal action plans and subsequent detailed designs for presumptive remedies. Maintaining continuity from the early stages of planning through design and construction will instill feedback into all phases of work. Team members will be motivated to work efficiently during each phase because they will be targeting and working towards site closure on a continuing basis.

- Utilizing flexible contracting mechanisms to expedite procurement and subsequent construction efforts. By developing a pool of prequalified contractors and vendors, procurement can be expedited and site closure goals can be achieved sooner.

- Improving processes and adding value to work efforts. Project team members will have the responsibility of assessing their roles on the program and determining how best to accomplish project goals. As project requirements change, planned activities will have to demonstrate value added to the program before they can be approved and implemented.

4.4.1.2 Regulatory Agency Commitment

The execution plan will address the need to obtain regulatory commitment to planned program activities from the outset. To this end, EPA and NMED expectations will be defined and addressed. Furthermore, the ability of the agencies to respond to submittals, including plans for review or permit applications, will be incorporated into the execution plan.

Regulatory agency expectations will be defined for:

- Technical content of submittals
- Timing for submittal and review of plans, designs, reports, and permit applications
- Responsibilities of project team members and the definition of authority when deviations to planned activities occur
- Issuance of action memoranda and site closure certifications
- Other issues as deemed appropriate

4.4.1.3 Community Involvement

The NCP requires a number community involvement efforts prior to and during the implementation of removal actions. The concerns of the community will be incorporated within the execution plan along with the means by which requirements will be achieved. The RAB will factor heavily into community relations and involvement efforts.

4.4.2 <u>Program Execution and Evaluation</u>

As with the pilot program, project team members will review the progress of the base-wide removal action program. Fulfilling expectations, managing effectively, complying with regulations, and instilling quality into work efforts will be issues addresses on a regular basis.